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PREPRINT

An Analysis of Environment, Safety, and Health (ES&H) Management Systems for Department of Energy (DOE) Defense Programs (DP) Facilities

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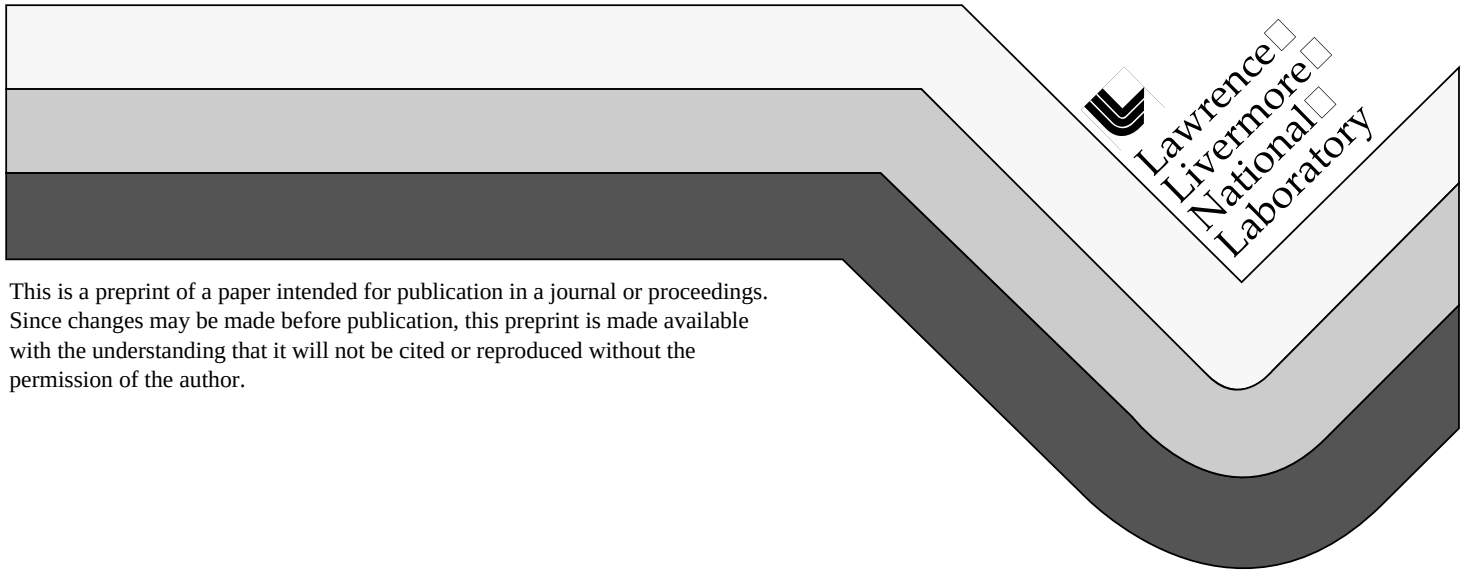

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An Analysis of

Environment, Safety, and Health (ES&H) Management Systems

for

Department of Energy's (DOEs) Defense Program (DP) Facilities

Office of Defense Programs (DP-45)

March 1998

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AN ANALYSIS OF ES&H
MANAGEMENT SYSTEMS

March 1998

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SECTION 1.0 INTRODUCTION

The purpose of this paper is to provide a summary analysis and comparison of various environment, safety, and health (ES&H) management systems required of, or suggested for use by, the Department of Energy Defense Programs' sites. The summary analysis is provided by means of a comparison matrix, a set of Venn diagrams that highlights the focus of the systems, and an "And Gate" filter diagram that integrates the three Venn diagrams. It is intended that this paper will act as a starting point for implementing a particular system or in establishing a comprehensive site-wide integrated ES&H management system. Obviously, the source documents for each system would need to be reviewed to assure proper implementation of a particular system.

The matrix compares nine ES&H management systems against a list of elements generated by identifying the unique elements of all the systems. To simplify the matrix, the elements are listed by means of a brief title. An explanation of the matrix elements is provided in Attachment 2 entitled, "Description of System Elements." The elements are categorized under the Total Quality Management (TQM) "Plan, Do, Check, Act" framework with the added category of "Policy". (The TQM concept is explained in the "DOE Quality Management Implementation Guidelines," July 1997 (DOE/QM-0008)). The matrix provides a series of columns and rows to compare the unique elements found in each of the management systems. A "✔" is marked if the element is explicitly identified as part of the particular ES&H management system. An"✘" is marked if the element is not found in the particular ES&H management system, or if it is considered to be inadequately addressed. A "**?**" is marked if incorporation of the element is not clear. Attachment 1 provides additional background information which explains the justification for the marks in the matrix cells.

Through the Venn diagrams and the "And Gate" filter in Section 3, the paper attempts to pictorially display the focus of each system with respect to ES&H, the hazard of concern, and any limitations with respect to the TQM categories. A summary evaluation and explanation of each of the systems is provided in Section 4 of the paper. Several other ES&H systems were reviewed in preparation of the paper, but were not specifically included as a system in this matrix. Only those ES&H management systems that are potentially applicable to DOE Defense Program sites were included as part of the matrix comparison. A description of other ES&H management systems that were evaluated, but not specifically incorporated in this matrix comparison, are provided in Attachment 3 entitled, "Other ES&H Management Systems Reviewed."

In the past, it has been difficult integrating ES&H into work planning for several reasons. One barrier to this integration has been the complexity caused by the existence of several "stove pipe" ES&H systems. By analyzing the unique elements of the various ES&H systems, as well as their strengths and limitations, and their similarities and differences, it is envisioned that this paper will aid in facilitating the integration of ES&H into work planning. This paper was developed by the Office of Defense Programs (DP-45) and all questions or comments should be directed to Anthony Neglia of that office at (301) 903-3531 or *Anthony.Neglia@dp.doe.gov*. ❖

SECTION 2.0 MATRIX COMPARISON

The following matrix provides a high-level comparison of nine environment, safety and health (ES&H) management systems that are either required of, or suggested for use by the Department of Energy's Defense Programs (DP) facilities. The nine systems are compared against a set of unique system elements that were generated by review of all the systems. If an element was found to be an element in any one of the nine systems, it was included in the matrix.

The unique elements were categorized under the Department's Total Quality Management (TQM) "Plan, Do, Check, Act" framework plus the addition of a fifth category, "Policy." TQM is the Department's approach in providing for continuous improvement in the pursuit of excellence. This structure is similar to and consistent with the Integrated Safety Management Systems' structure of "plan, perform, assess, and improve" which has been institutionalized throughout the Department.

It should be noted that not all nine ES&H systems are true ES&H management systems. The definition employed for classification as an ES&H management system is "a formal process to include organizational structure, responsibilities, practices and resources, whereby people plan, perform, assess, and improve the conduct of work." (This definition is a combination of the definitions for management systems used by ISMS and ISO 14001). However, whether one of the 'systems' has been identified as a "system" "program" "code" or a "standard" is unimportant to this comparison. What is important is that many of these "systems" exist and are all tools to help sites manage ES&H as part of the work process. These various "systems" have similarities and differences; strengths and limitations; but can be used in conjunction with each other to produce a strong integrated safety management system.

The danger with high-level depiction of complex systems is that such a comparison may not present the complete picture. For example, while two systems may both have a check (✓) for an element, (i.e. "Documentation"), the amount and detail of documentation required by the two systems could be different. Accordingly, it is recommended that the system's source document be reviewed when implementing a system. ❖

Matrix Comparison

Elements \ Mgmt Systems	DOE ISMS	DOE ES&H Mgmt Plan	PSM	RMP	ISO 14001	CEMP	Responsible Care®	VPP	Risk Mgmt Framework
POLICY									
Management commitment	✔	✔	✔	✔	✔	✔	✔	✔	✘
Line management	✔	✔	✔	✔	✔	✔	✔	✔	✘
PLAN									
Communication	✔	✔	✔	✔	✔	✔	✔	✔	✔
Documentation	✔	✔	✔	✔	✔	✔	✔	✔	✘
Employee involvement	✔	✔	✔	✔	✔	✔	✔	✔	✘
Stakeholder involvement	✔	✔	✘	✔	✔	✔	✔	✘	✔
Define scope of work	✔	✔	✘	✘	✔	✘	✔	✔	✔
Consider alternatives	✔	✘	✘	✘	✔	✔	✔	✔	✔
Analyze hazards / impacts	✔	✔	✔	✔	✔	✔	✔	✔	✔
Mitigate hazards / impacts	✔	✘	✔	✔	✔	✔	✔	✔	✔
ID standards / requirements	✔	✔	✔	✔	✔	✔	✔	✔	✔
Risk-based prioritization	✔	✔	✔	✔	✔	✔	✔	✘	✔
Allocate resources	✔	✔	✘	✔	✔	✔	✔	✔	?
DO									
Integration	✔	✔	✘	✔	✘	✔	✔	✘	✘
Roles & responsibilities	✔	✔	✔	✔	✔	✔	✔	✔	✘
Start-up review / authorization	✔	✘	✔	✔	✔	✔	✔	✔	✘
Competence	✔	✘	✔	✔	✔	✔	✔	✔	✘
Oversight	✔	✘	✔	✔	✔	✔	✔	✔	✘
Tailored controls	✔	✘	✔	✔	✔	✔	✔	✔	✘
Perform work safely	✔	✘	✔	✔	✘	✘	✔	✔	✘
Emergency preparedness	✔	✘	✔	✔	✔	✔	✔	✔	✘
CHECK									
Performance goals	✔	✘	✔	✔	✔	✔	✔	✔	✔
Performance measurement	✔	✘	✔	✔	✔	✔	✔	✔	✔
Self assessment	✔	✘	✔	✔	✔	✔	✔	✔	✔
Independent assessment	✔	✘	✔	✔	✔	✔	✔	✔	✔
ACT									
Provide feedback on controls	✔	✘	✔	✔	✔	✔	✔	✔	✔
Compare results to	✔	✘	✔	✔	✔	✔	✔	✔	✔
Continuous Improvement	✔	✘	✔	✔	✔	✔	✔	✔	✔

KEY: ✔ = management system contains element ✘ = management system does not contain element **?** = not clear that system contains element or is considered to be inadequately addressed

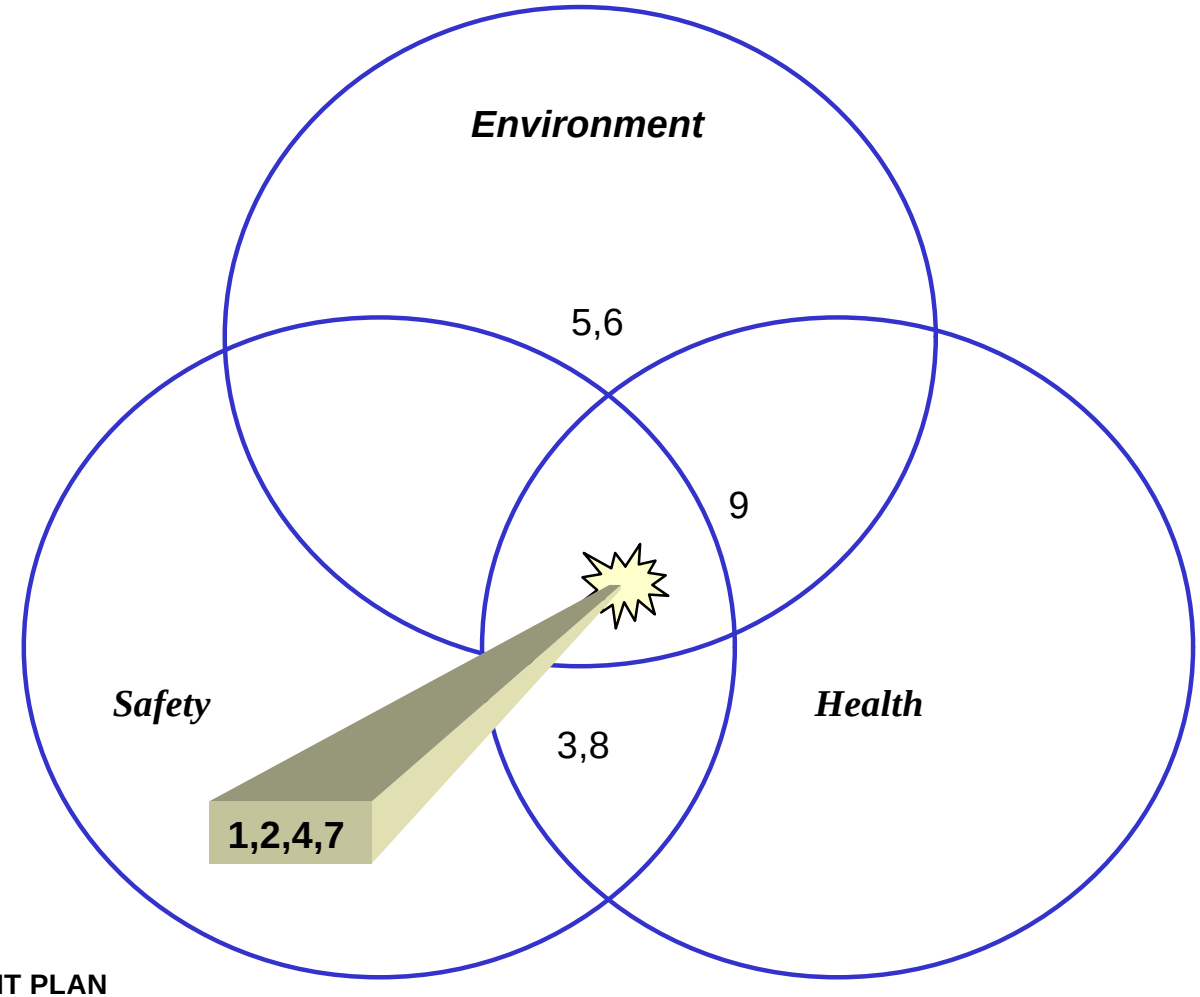
SECTION 3.0 VENN DIAGRAMS

The matrix in Section 2.0 provides a comparison of the nine ES&H management systems based on the identified unique elements. What is missing in this comparison is consideration of the hazards addressed by each system, and the primary focus of each system with respect to ES&H to include waste minimization / pollution prevention. The first Venn diagram depicts the environment, safety, and health functional areas. While a particular management system would not expect any ES&H requirements to be violated, if the emphasis of that particular system is focused on one functional area (i.e., ISO 14001 emphasizes the environment), it is placed only within the circle for that functional area. If a system explicitly addresses the three functional areas of ES&H (i.e., Responsible Care®), then it was placed in the area occupied by all three circles. When an ES&H Management System satisfies all the circles of a particular Venn diagram, it is identified with **BLOCK** letters.

The second Venn diagram covers the type of hazard emphasized by each ES&H management system. The three hazards were categorized as "chemical" "radiological" and "other." The third Venn diagram provides a pictorial look at the major elements of the matrix comparison. The five circles correspond to the Total Quality Management structure of "Plan, Do, Check, Act" plus the added category, "Policy."

The final chart is an "And Gate" screen. To pass through the screen, a system must meet all the requirements of that particular screen. As can be seen, the DOE ISMS is the only management system to pass through all three screens. ❖

ES&H Functional Area Venn Diagram



Key:

1 = ISMS

2 = ES&H MGMT PLAN

3 = OSHA PSM

4 = EPA RMP

5 = ISO 14001

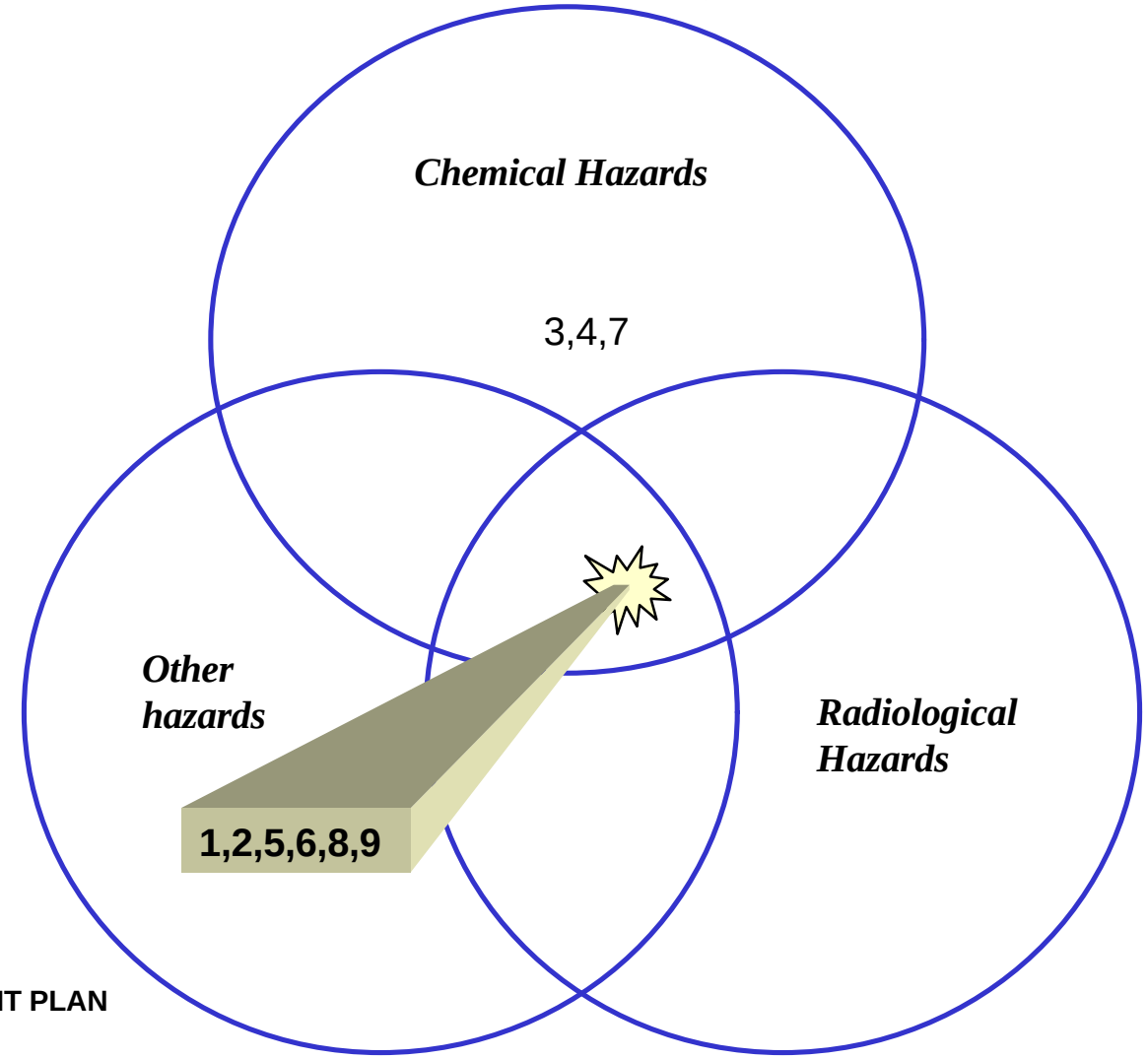
6 = EPA CEMP

7 = RESPONSIBLE CARE

8 = VPP

9 = RISK MANAGEMENT FRAMEWORK

Hazard Venn Diagram



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5 = ISO 14001

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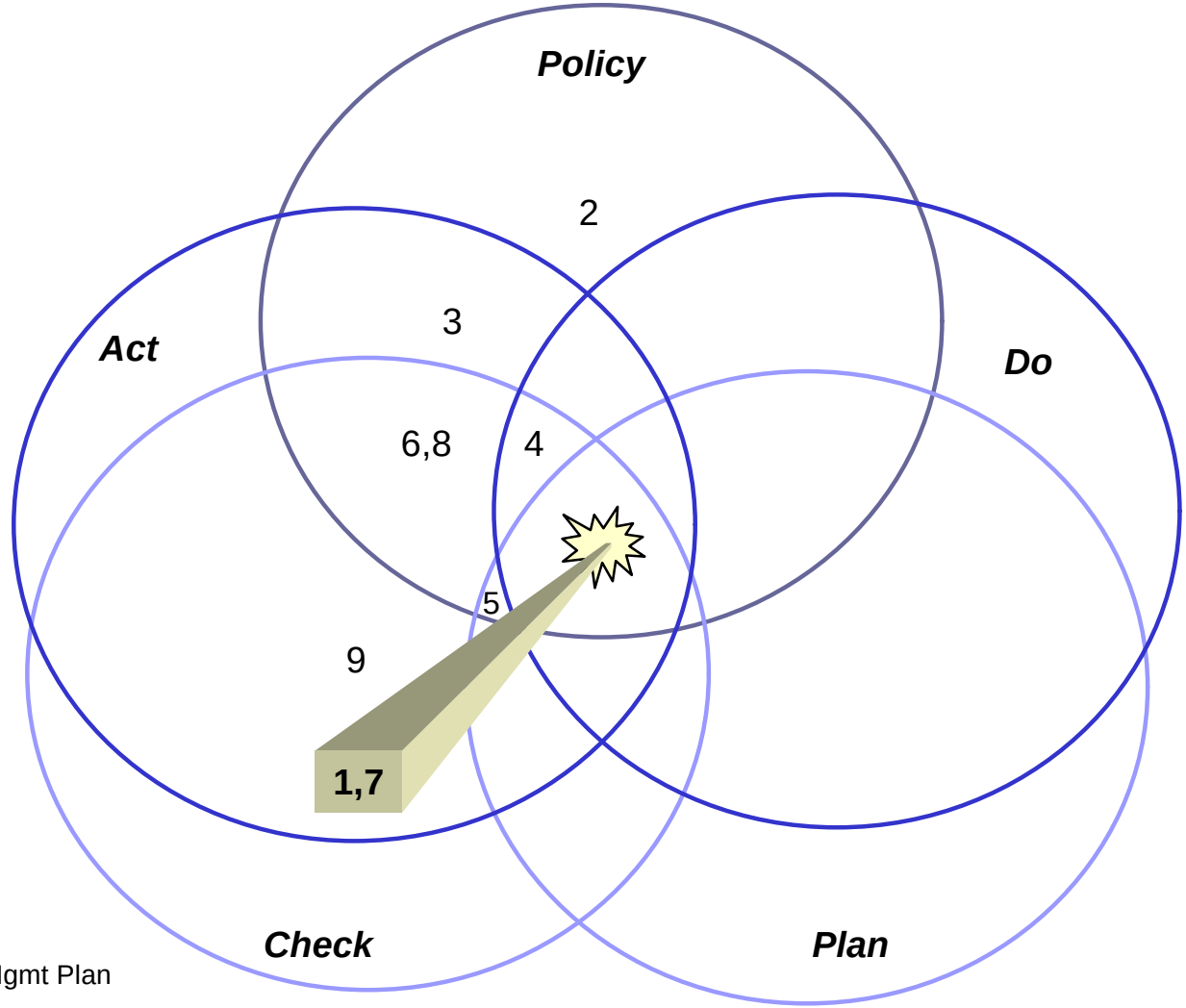
8 = VPP

9 = RISK MGMT FRAMEWORK

ES&H System Elements Venn Diagram



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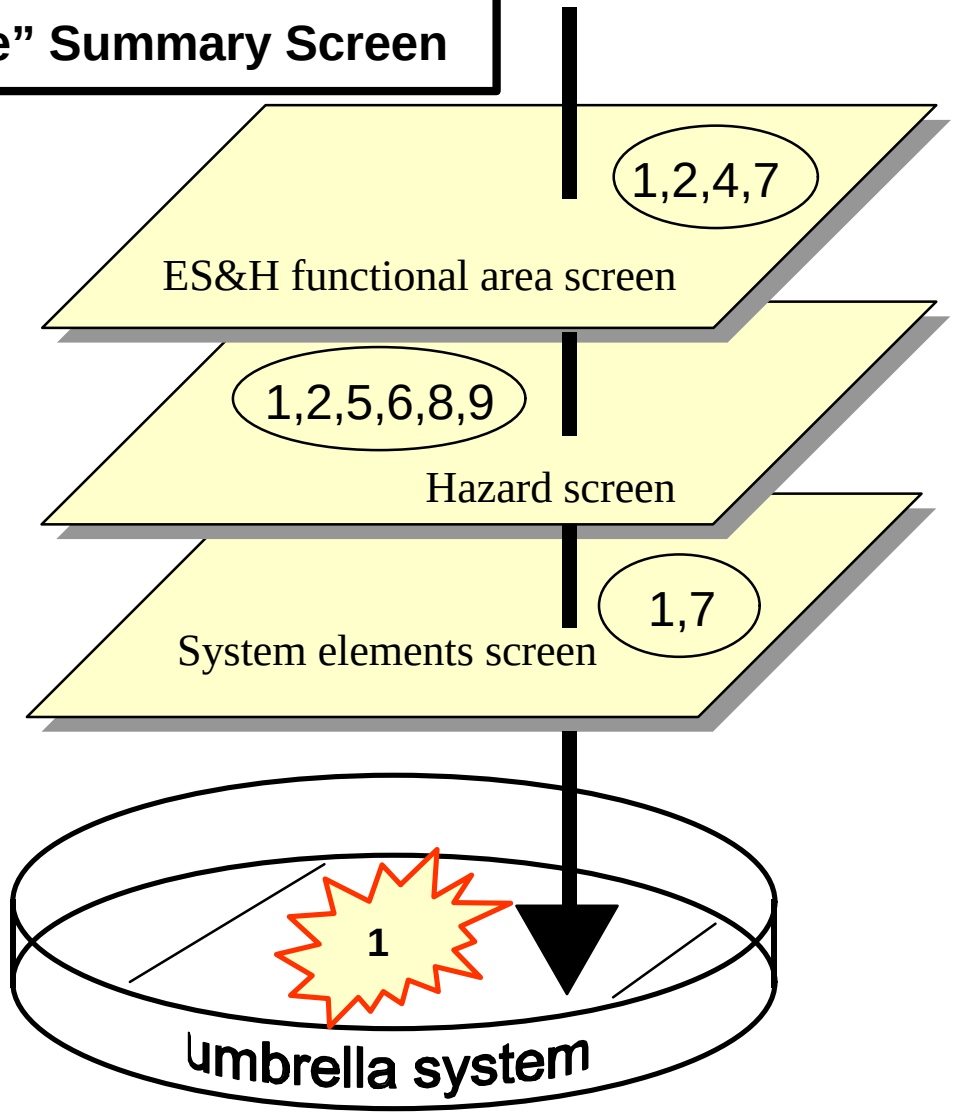
"And-Gate" Summary Screen



Systems 2,7,& 9 pass two of the three screens.

SECTION 4.0 SUMMARY DESCRIPTIONS

This section provides additional information to include a graphic depiction of the system process on each of the nine ES&H management systems evaluated in this paper. The system is described, a regulatory or other type driver is listed, the purpose of the system is explained, the date of implementation within DOE is provided, and the emphasis of the system is highlighted along with its strengths and limitations. A reference is provided which includes the Internet Universal Resource Locator (URL) address if available. Lastly, a contact person within DOE is listed. ❖

DOE Integrated Safety Management System (ISMS)

Description: Integrated Safety Management System (ISMS) is a formal, organized process whereby people plan, perform, assess, and improve safe (where "safety" is defined as environment, safety and health to include waste minimization / pollution prevention) conduct of work. The ISMS, institutionalized through the Department of Energy's directives and contracts, consists of six components: (1) the objective, (2) guiding principles, (3) core functions, (4) mechanisms, (5) responsibilities, and (6) implementation.

Driver: DNFSB 95-2, DOE P 450.4 & 48 CFR Chapter 9.

Purpose: The objective of an Integrated Safety Management System is to incorporate safety into management and work practices at all levels, addressing all types of work and all types of hazards to ensure safety for three sectors: the workers, the public, and the environment.

Date: October 1996 (DOE G 450.4-1 issued final 11/26/97)

Emphasis: To "do work safely"

Strength: Department-wide system that can act as an umbrella system incorporating the other ES&H management systems into it.

Limitations: While the ISMS Guide talks to active worker participation in the safety process, public participation in the process needs more emphasis, especially with regard to communication of risk.

Reference: DOE P 450.4; DOE G 450.4-1
http://tis-nt.eh.doe.gov/ism/

Contact: Rich Stark (EH-31) for content, and Dick Crowe (DP-30) for policy

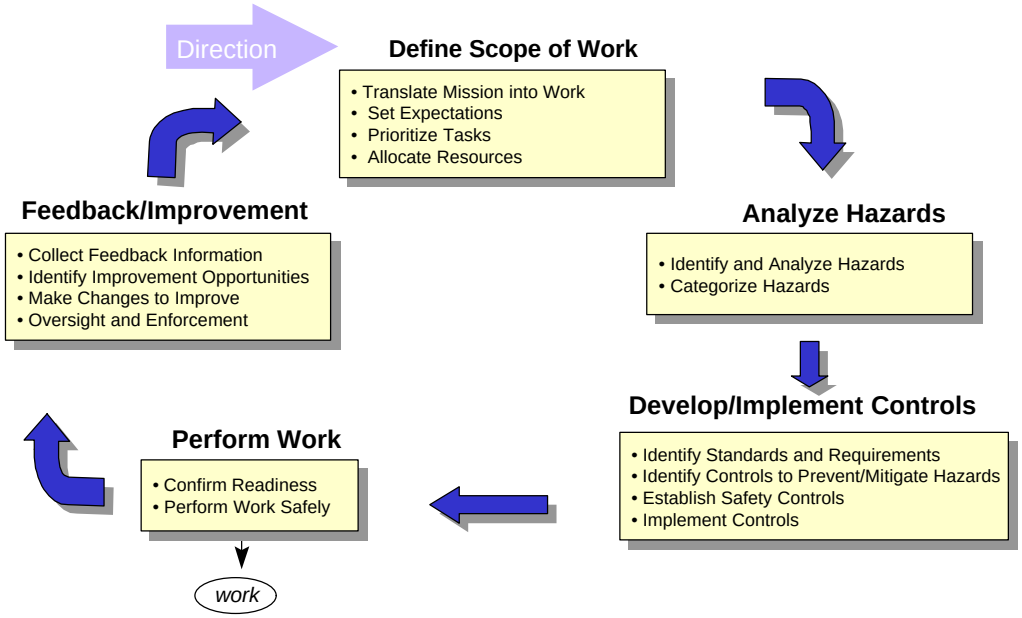


Figure from DOE G 450.4-1

ES&H Management Planning Process

Description: The ES&H Management Planning Process consists of: information on planned ES&H activities with associated resources in support of the budget submission, a summary of major ES&H commitments, and a summary of risk management conclusions for the site.

Driver: DOE Strategic Management System & UNICALL Budget Guidance

Purpose: Integrate ES&H with work planning and budgeting aspects of these requirements

Date: April 3, 1992 Watkins initiates a risk-based approach for prioritizing activities as part of the ES&H Planing Process. ES&H Management now required in M&O Contracts per 48 CFR 970.5204-2.

Emphasis: ES&H activity planning and risk-based prioritization

Strength: A management information system for ES&H planned activities and associated resources that is not only used for information requirements within the Department, but also for reporting ES&H information external to the Department.

Limitations: No follow-up to ES&H planning (the "Do" phase is weak)

Reference: DOE Budget Formulation Handbook:
http://www.cfo.doe.gov/budget/handbook/handbook.htm
DOE ES&H Management Planning Process:
http://tis-nt.eh.doe.gov/bps/eshplan/index.htm
DOE Strategic Management System: http://hst.dync.doe.gov/solomon/sms/sms.htm

Contacts: Ray Blowitski (EH-73)

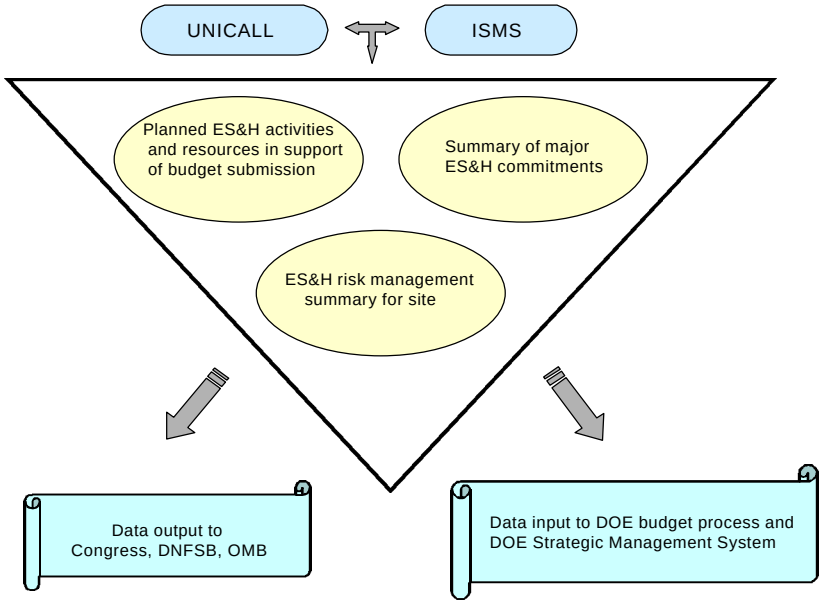


Figure created by DP-45 for illustration purposes only.

OSHA Process Safety Management (PSM)

Description: A chemical process safety standard designed to protect employees from serious danger associated with accidental release of highly hazardous chemicals in the workplace.

Driver: 29 CFR 1910.119. Authorized under the Clean Air Act Amendments (CAAA, Section 304(A))

Purpose: To prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals (with a focus on protection of worker safety and health)

Date: February 1992

Emphasis: Worker safety, prevention of catastrophic accidents

Strength: Formal requirement for review of the process, to include, compilation of process safety information, process hazard analysis and written operating procedures for each process. All these measures are conducted with active employee participation.

Limitations: No performance evaluation, no stakeholder involvement, focus limited to hazardous chemicals, public and environmental considerations are implicit only

References: 29 CFR 1910.119 (available through the Government Printing Office (GPO) at http://www.access.gpo.gov/nara/cfr/index.html -- or available through OSHA at : http://www.osha-slc.gov/OshStd_data/1910_0119.html
Additional DOE references available through:
http://tis-hq.eh.doe.gov/web/chem_safety/

Contacts: Ken Murphy (EH-53)

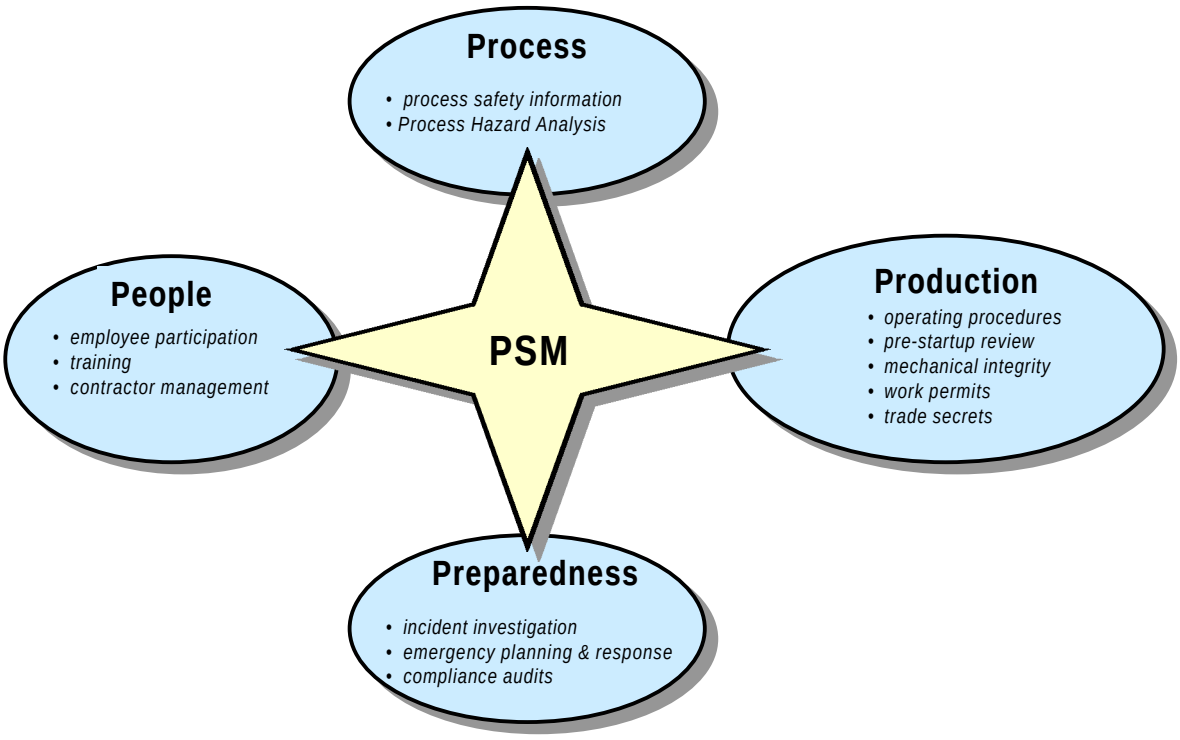


Figure based on DOE-HDBK-1101-96 with text added

EPA Risk Management Program (RMP)

Description: The EPA Risk Management Program for chemical accident prevention consists of a hazard assessment, a prevention program and an emergency response program summarized in a risk management plan. Chemical processes with a regulated substance above a threshold quantity, are classified into three categories ("Programs") according to their size and risks they may pose to ensure that the individual processes are subject to the appropriate requirements.

Driver: 40 CFR Part 68

Purpose: To prevent and mitigate accidental releases of chemicals that have the potential to affect public health and the environment.

Date: June 1996 (published in the *Federal Register* on Thursday, June 29, 1996) (61 FR 31667)

Emphasis: Chemical accident prevention

Strength: Scale the requirements to fit the risk. Integrates with and complements both the Emergency Planning and Community Right-to-Know Act of 1986 and OSHA's Process Safety Management standard.

Limitations: Focus limited to chemical accidents

Reference: 40 CFR Part 68: http://www.epa.gov/swercepp/rules/listrule.html
DOE guidance available at: http://tis-hq.eh.doe.gov/web/chem_safety/

Contact: Gustavo (Gus) Vázquez (EH-41)

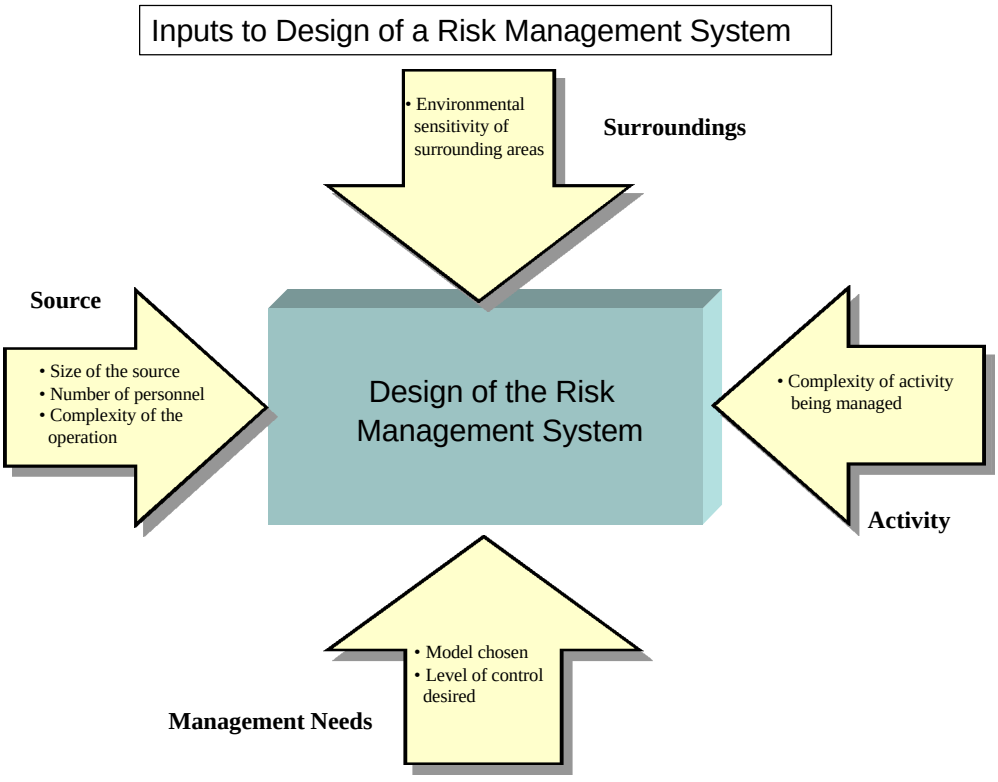


Figure from "Risk Management program Handbook" Thompson Publishing Group. Arthur D. Little, Inc. December 1996

ISO 14001 Environmental Management Systems

Description: ISO 14001 is an international standard that calls for organizations to conduct their environmental affairs within a structured management system that is integrated with the overall management activity. The environmental management system consists of: a policy, planning, implementation, checking and corrective action, and management review.

Driver: Public Law 104-113 [H.R.2196] "Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies."

Purpose: To achieve better environmental performance through the systematic identification and management of environmental aspects, impacts, objectives, performance and targets.

Date: September 1996

Emphasis: Environmental management

Strength: Internationally recognized environmental management system framework; provision for independent third-party certification.

Limitations: Focus limited to the environment.

Reference: ISO 14001, First Edition, 1996-09-01 (ISO 14001:1996(E)). Available for purchase through American National Standards Institute (ANSI) at (212) 642-4900. Text of ISO 14001 available at:
http://www.qs9000.com/iso14000.html

Contact: Larry Stirling (EH-12)

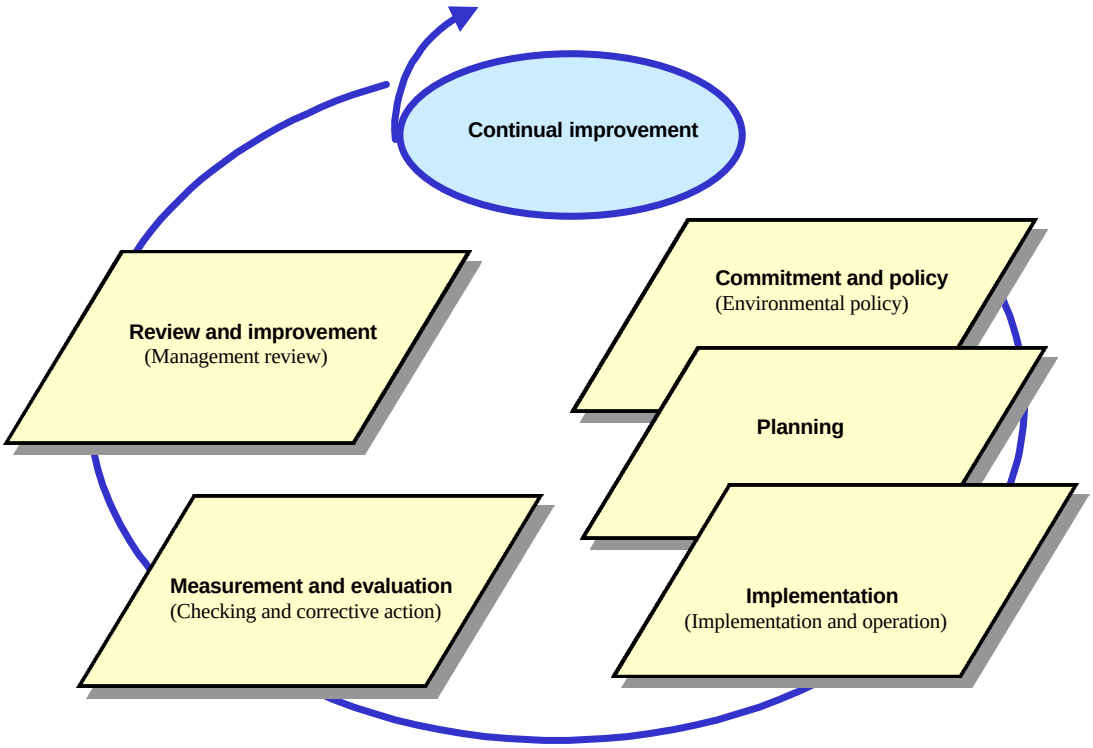


Figure from ISO 14004:1996(E)

EPA Code of Environmental Management Principles (CEMP)

Description: CEMP is a collection of five broad principles and underlying performance objectives that provide the basis for Federal agencies to move toward responsible environmental management. The five broad principles are: (1) management commitment, (2) compliance assurance and pollution prevention, (3) enabling systems, (4) performance and accountability, and (5) measurement and improvement.

Driver: Executive Order 12856. Voluntary. Incorporated with ISMS at DOE sites (per Guimond letter 10/21/96).

Purpose: To encourage Federal agencies to reach the highest level of environmental performance, "world class" or "best-in-class." CEMP encourages setting goals "beyond compliance."

Date: October 1996 (published in the *Federal Register* on Wednesday, October 16, 1996) (61 FR 54062)

Emphasis: Focus on environmental management practices

Strength: Acts as a Federal government environmental "challenge" program.

Limitations: Focus limited to the environment, does not focus on work processes.

Reference: "Implementation Guide for the Code of Environmental Management Principles for Federal Agencies." (EPA-315-B-97-001).
March 1997. Contact Priscilla Harrington, EPA: (202) 564-2461

Contact: Larry Stirling (EH-412)

Figure from EPA, "Implementation Guide for the Code of Environmental Management Principles for Federal Agencies (CEMP)"
(EPA-315-B-97-001), March 1997

Chemical Manufacturer's Association (CMA) Responsible Care®

Description: Responsible Care® consists of: (1) guiding principles, (2) codes of management practices, (3) a public advisory panel, (4) member self-evaluations, (5) measures of performance, (6) management systems verification, (7) executive leadership groups, (8) mutual assistance, (9) partnership program, and (10) obligation of membership.

Driver: Voluntary. DOE/CMA Memorandum of Understanding (MOU), signed August 1, 1996

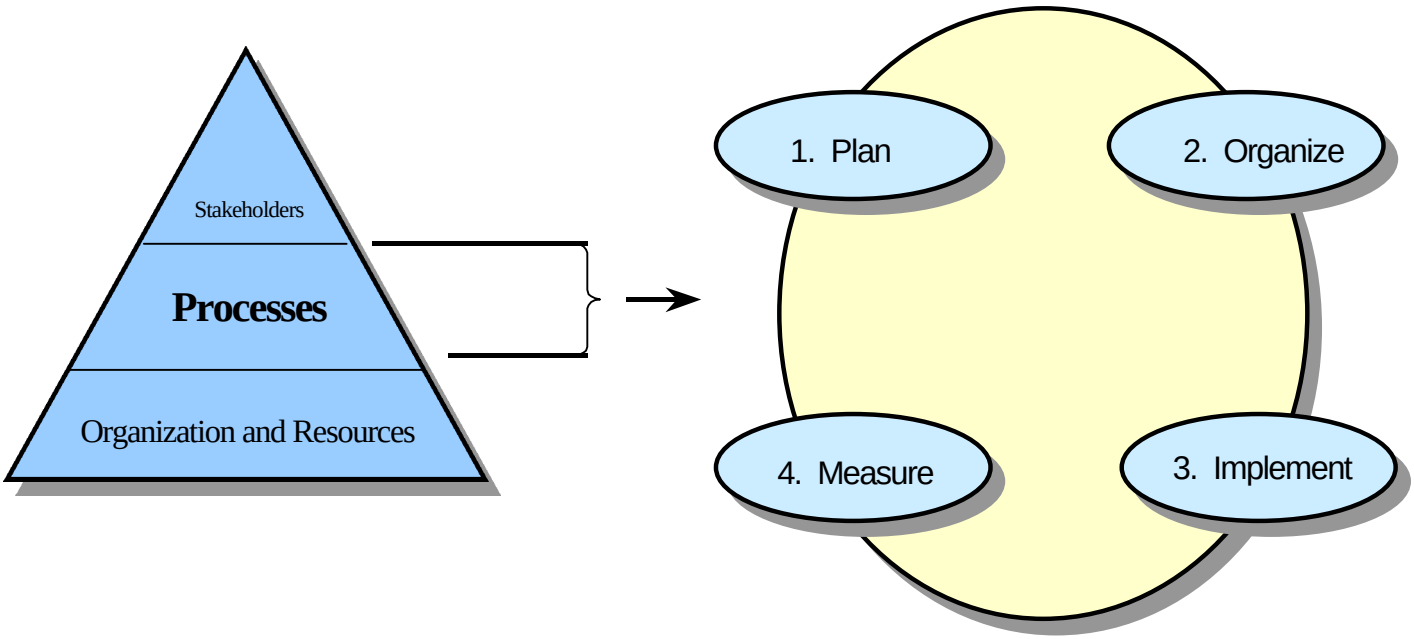
Purpose: To aid in continuous improvement of responsible chemical management and ES&H performance

Date: 1988 - initiation by CMA; 1996 - DOE / CMA MOU authorizes participation by DOE

Emphasis: Responsible management of chemicals

Strength: The public is directly involved in shaping the initiative through the Public Advisory Panel and mutual assistance creates an united industry-wide effort for improvement.

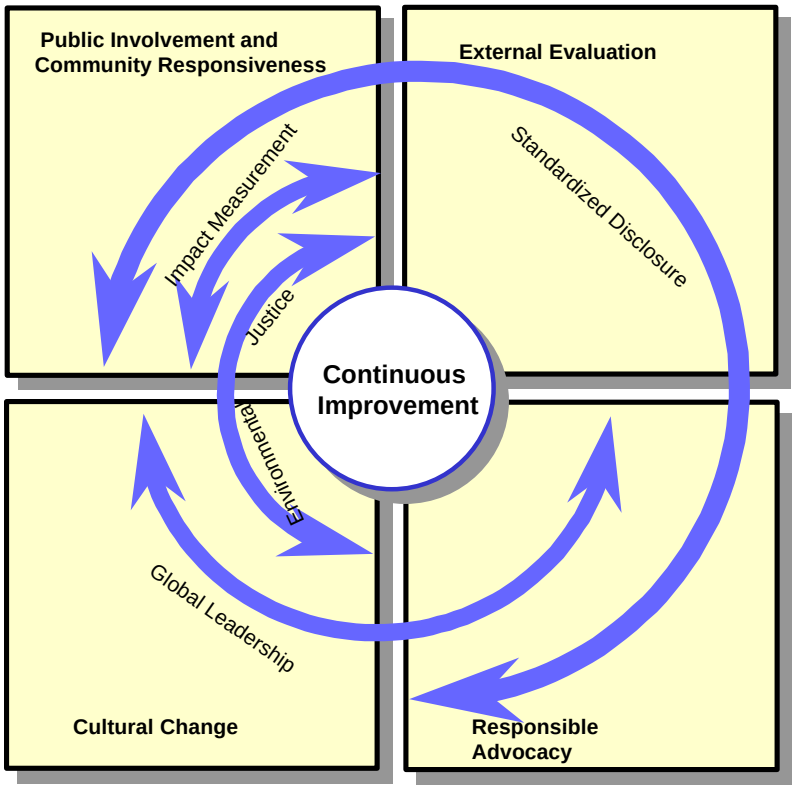
Limitations: Focus limited to chemical management.



Reference: general information brochures and other reference material available from CMA: (703) 741-5034 or through http://www.cmahq.com/rescare.html. Refer to the DOE/CMA MOA to purchase CMA materials. Other DOE references available through http://tis-hq.eh.doe.gov/web/chem_safety/

Contact: Ken Murphy (EH-53)

Figure from "Responsible Care In Action: 1993-94 Progress Report" Chemical Manufacturers Association (CMA) publication 15M, October 1994, page 37.



DOE / OSHA Voluntary Protection Program (VPP)

Description: DOE VPP, similar to OSHA's VPP, consists of three occupational safety and health protection programs: Star, Merit, and Demonstration. The Star Program is for truly outstanding protection; the Merit Program is a stepping-stone for contractors; and the Demonstration Program is for unusual situations about which DOE must learn more to establish the requirements for a Star Program.

Driver: Voluntary, Sanctioned by DOE Secretary O'Leary on January 26, 1994.

Purpose: To encourage and recognize excellence in occupational safety and health protection

Date: January 1994

Emphasis: Excellence in occupational safety and health.

Strength: Active employee involvement in safety

Limitations: No external stakeholder involvement, focus limited to worker health and safety

Reference: DOE EH publication, "Program Elements" February 1994
DOE VPP description: http://tis.eh.doe.gov/docs/shc/941.spri.sec03.html

Contact: Nancy Hammond, (EH-51)

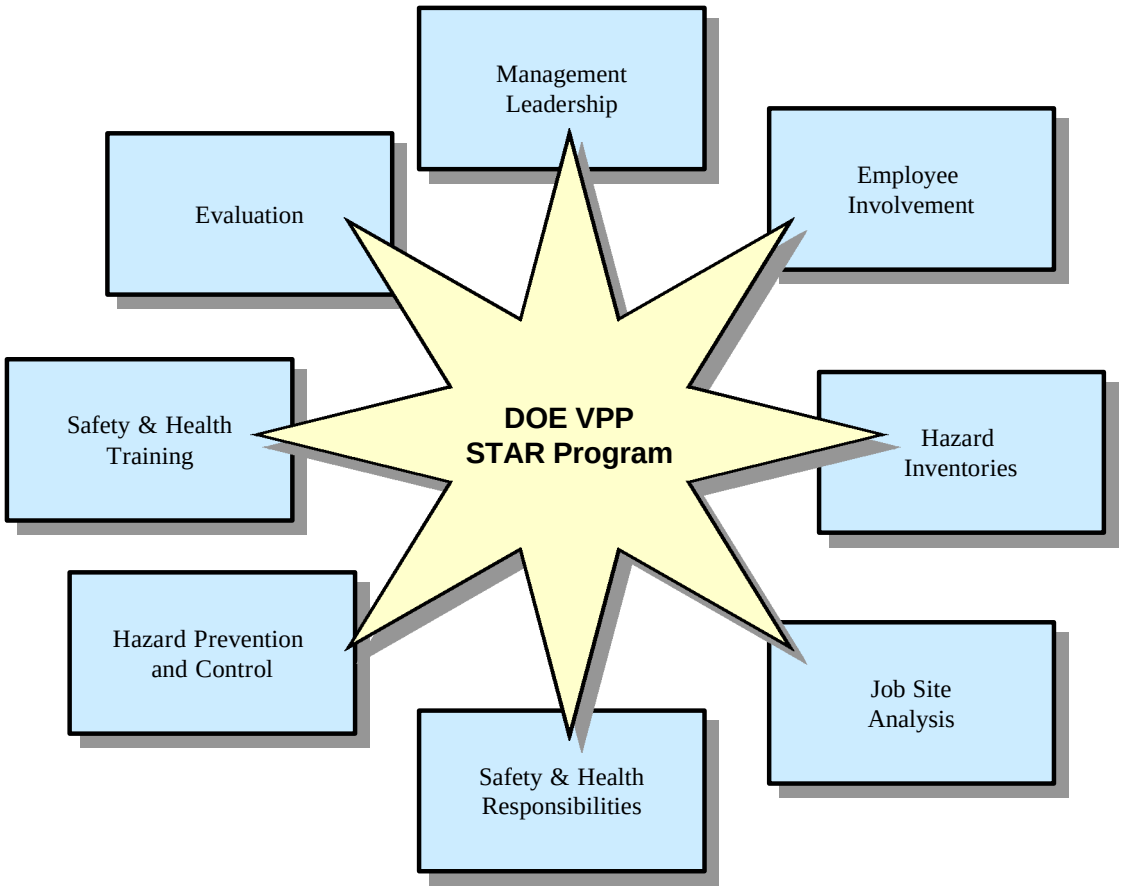


Figure created for illustration purposes for this paper -- it is not an official OSHA or DOE VPP diagram.

Commission's Risk Management Framework

Description: The Framework is a six stage process to manage risk. The stages are: (1) define the problem, (2) analyze the risk, (3) examine options, (4) make decisions, (5) take action, and (6) conduct an evaluation. Every stage incorporates three key principles: broader context, stakeholder participation, and iteration.

Driver: Voluntary

Purpose: To help managers make good risk management decisions while taking into account social, cultural, ethical, political, and legal considerations.

Date: January 1997

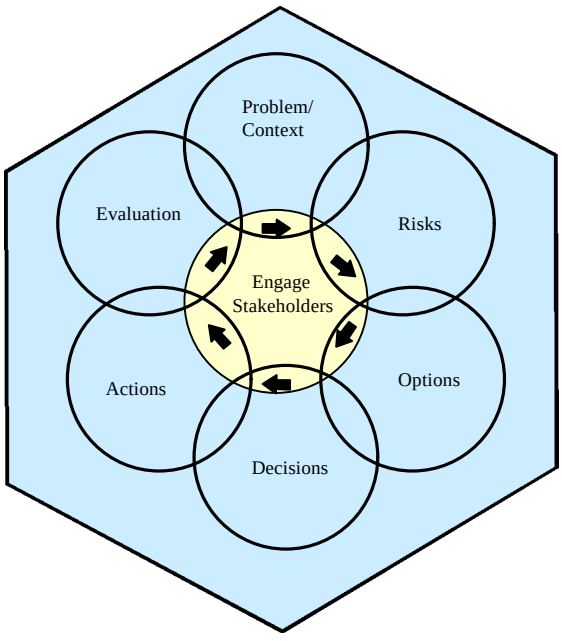
Emphasis: Managing risk

Strength: Stakeholder collaboration and can address multiple environmental media and sources of risk

Limitations: Not designed to manage routine ES&H matters

Reference: "Framework for Environmental Risk Management" Presidential / Congressional Commission on Risk Management, Final Report, Volume 1. Available through: http://www.riskworld.com/Nreports/1996/risk_rpt/Rr6me001.htm

Contact: Rick Jones (EH-51)



F i g u r e from "Framework for Environmental Health Risk Management." The Presidential/Congressional Commission on Risk Assessment and

Risk Management. Final Report. Volume 1. 1997

SECTION 5.0 SUMMARY AND CONCLUSION

While the comparison and analysis of the nine ES&H management systems was done at a high level, it is believed that this paper is a good starting point for the reader to pursue a more detailed analysis of the different systems in implementation of a particular system at a site and/ or in deciding on the best approach to establish an integrated ES&H management system.

The analysis reveals an extensive commonality of principles and elements which supports the proposition for a single integrated management system for ES&H that includes the identified system elements and can be enhanced by integrating into a umbrella system the particular features of the specific systems. Based on the results of the matrix comparison and the Venn diagrams, and the requirements of 48 CFR and the Department of Energy Acquisition Regulations, it would seem logical to employ the Department's Integrated Safety Management System as the umbrella system upon which to build an overall site integrated ES&H management system.

The ES&H Management Planning Process which is strong in identifying planned ES&H activities and their associated resources, has been identified in the Unified Field Budget Call as satisfying those requirements of the ISMS. Process Safety Management and the Risk Management Program, both required by federal regulations and considered to be complements with respect to accidental release of chemicals, have not unusual elements that would preclude their incorporation into ISMS.
Finally, should a contractor decide to move "beyond compliance," the ISMS umbrella system would meet the requirements of the Code of Environmental Management Principles and the Voluntary Protection Program, complementary with respect to challenging contractors to achieve excellence. However, the contractor needs to guard against the danger of, in making the site's ISMS so all inclusive, that it becomes too complex to be workable. ❖

Attachment 1

Supporting Justification for Matrix Evaluation

Mgmt System / Elements		Supporting Justification: DOE ISMS *(References are from the "Integrated Safety Management System Guide" DOE G 450.4-1, November 26, 1997, Volumes 1 and 2; and from the Policy DOE P 450.4)*
POLICY		
Management commitment	✔	DOE P 450.4 establishes DOE management commitment.
Line management responsibility	✔	DOE P 450.4, Component 2, Guiding Principles, establishes line management responsibility.
PLAN		
Communication	✔	DOE P 450.4, Component 2 establishes the need for clear roles and responsibilities "established and maintained at all organizational levels withing the Department and its contractors." This means that communication must occur throughout the organization.
Documentation	✔	DOE G 450.4-1, Volume 1, Chapter 1, Page 4, Section 1: "The processes for integrating an SMS include development, documentation, review and approval, implementation of the SMS, and authorization for operation." Chapter 2 further discusses the need for documentation.
Employee involvement	✔	DOE P 450.4, under the section entitled, "Policy": "Direct involvement of workers during the development and implementation of safety management systems is essential for their success."
Stakeholder involvement	✔	The ISMS guidance references the need to provide for "communication" to the public: "An integrated SMS should provide for communication of potential impact of specific work across the institution . . . and the public." [DOE G 450.4-1 (11/26/97), Volume 2, Appendix C, Page C-21]
Define scope of work	✔	DOE P 450.4, Component 3, Core Functions, establishes the need to define the scope of work.
Consider alternatives	✔	DOE G 450.4-1, Volume 1, Chapter II, Page 23, Section 2.5: "An integrated SMS should address a variety of options and tradeoffs to promote the safe completion of work. These tradeoffs include negotiating work scope, establishing performance objectives, identifying resources, selecting personnel, and adjusting schedules."
Analyze hazards, impacts	✔	DOE P 450.4, Component 3, Core Functions, establishes the need to analyze hazards.
Mitigate hazards / impacts	✔	DOE P 450.4, Component 3, Core Functions, establishes the need to develop and implement hazard controls.
ID standards / requirements	✔	DOE P 450.4, Component 3, Core Functions, establishes the need to identify applicable standards and requirements under "Develop and Implement Hazard Controls."
Risk-based prioritization	✔	DOE G 450.4-1, Section 2.1, Page 21, Volume 1, Chapter II: "DEAR 970.20-1(b)(4) requires resources to be effectively allocated to address ES&H, programmatic, and operational considerations to ensure that DOE attends to its most significant hazards first, in a cost-effective manner." This discussion focuses heavily on effective "resource allocation," but seems to adequately imply "risk-based" prioritization.
Allocate resources	✔	DOE P 450.4, Component 3, Core Functions, Balanced Priorities: "Resources shall be effectively allocated . . . ."
DO		
Integration	✔	DOE P 450.4, Component 1: "Te Department and Contractors must systematically integrate safety into management and work practices at all levels so that missions are accomplished while protecting the public, the worker, and the environment."
Roles & responsibilities	✔	DOE P 450.4, Component 2, Guiding Principles, calls for establishing clear roles and responsibilities.
Start-up review / authorization	✔	DOE P 450.4, Component 2, Guiding Principles; and Component 3, Core Function (Perform work within controls) establishes operations authorization.
Competence	✔	DOE P 450.4, Component 2, Guiding Principles, requires competence commensurate with responsibilities

Mgmt System / Elements		Supporting Justification: DOE ISMS *(References are from the "Integrated Safety Management System Guide" DOE G 450.4-1, November 26, 1997, Volumes 1 and 2; and from the Policy DOE P 450.4)*
Oversight	✔	DOE G 450.4-1, Volume 1, Chapter III, Page 45, Section 3.4 (c): "An integrated SMS should include provisions to ensure that ongoing work continues to be performed within the specified and agreed-upon controls." Section 3.5: "The feedback/improvement process includes the following: line and independent oversight is conducted."
Tailored controls	✔	DOE P 450.4, Component 2, Guiding Principles, requires hazard controls tailored to the work.
Perform work safely	✔	The purpose of DOE P 450.4 is to do work safely.
Emergency preparedness	✔	DOE G 450.4-1, Volume 1, Chapter II, Page 32, Section 5. "The safety management system should ensure that safety control measures that have been mutually agreed upon are integrated into work performance and that . . . the controls are adequate to ensure safe work performance and to prevent accidents, uncontrolled releases or unacceptable exposures . . . ." "For nuclear facilities, DOE Order 5480.23 requires appropriate consideration of conduct of operations, emergency preparedness, fire protection, etc." (Page 33).
CHECK		
Performance goals	✔	DOE P 450.4, Component 3, Core Functions: "Provide Feedback and Continuous Improvement. Feedback information on the adequacy of controls is gathered, opportunities for improving the definition and planning of work are identified and implemented, line and independent oversight is conducted, and, if necessary, regulatory enforcement actions occur." Chapter III, page 45 of the Guide also addresses performance measures.
Performance measurement	✔	
Self assessment	✔	
Independent assessment	✔	
ACT		
Provide feedback on controls	✔	DOE P 450.4, Component 3, Core Functions: "Provide Feedback and Continuous Improvement. Feedback information on the adequacy of controls is gathered, opportunities for improving the definition and planning of work are identified and implemented, line and independent oversight is conducted, and, if necessary, regulatory enforcement actions occur." Chapter III, page 45 of the Guide also addresses the feedback and improvement steps.
Compare results to goals/measures	✔	
Continuous Improvement	✔	

Supporting Justification *(continued)*

Mgmt System Elements		DOE ES&H Management Planning Process
POLICY		
Management commitment	✔	DOE Strategic Management provides for management commitment from S-1
Line management responsibility	✔	Annual Unified Field Budget Call (UNICALL) requires line managers to plan and budget for ES&H needs
Plan		
Communication	✔	ADSs and Strategic Management System communicate ES&H needs from field to budget to stakeholders
Documentation	✔	Safety (ES&H) Management System (48 CFR 970.5204-2 (c), (d), and (e); and the ES&H Budget
Employee involvement	✔	Strategic Management System centers around customers (includes employees)
Stakeholder involvement	✔	Strategic Management System centers around " customers" (both internal and external stakeholders)
Define scope of work	✔	Activity Data Sheet (ADS) process documents scope of work defined by managers at the facility
Consider alternatives	✘	not apparent in the ADS or strategic management system process
Analyze hazards, impacts	✔	ADSs identify hazards to be mitigated
Mitigate hazards / impacts	✘	ADSs show what projects are targeted for funding and those that are unfunded, but do not directly fix ESH hazards
ID standards / requirements	✔	ADS identify applicable standards, requirements, etc. driving the need for action
Risk-based prioritization	✔	ADS provide for risk-based prioritization of ES&H activities
Allocate resources	✔	ADSs show unfunded actions and those targeted for funding. FTE requirements can also be listed.
DO		
Integration	✔	ADS provide planning and budgeting input to the DOE budget which is tied to annual performance
Roles & responsibilities	✔	ADSs provide for identification of a responsible manager
Start-up review / authorization	✘	ADSs do not require a start-up review, however, line managers must authorize (approve) ADSs
Competence	✘	ADSs do not establish worker competency requirements
Oversight	✘	ADSs do not call for oversight of work
Tailored controls	✘	ADSs do not establish operational controls
Perform work safely	✘	Although the focus of the ADS process is to ensure funding of high-risk ES&H projects , it does not focus on implementation of specific projects.
Emergency preparedness	✘	ADSs do not call for emergency preparedness plans
Check		
Performance goals	✘	The ES&H Management Planning process does not establish performance goals
Performance measurement	✘	The ES&H Management Planning process does not set measures performance, although the ADS does allow for input of milestones.
Self assessment	✘	The ES&H Management Planning process does not call for self-assessment.
Independent assessment	✘	The ES&H Management Planning process does not call for independent assessment.

Mgmt System / Elements		DOE ES&H Management Planning Process
ACT		
Provide feedback on controls	✘	The ES&H Management Planning process does not provide for feedback on controls (although this appears to be a new requirement in the FY 2000 UNICALL).
Compare results to goals/measures	✘	The ES&H Management Planning process does not compare results to goals (although this appears to be a new requirement in the FY 2000 UNICALL).
Continuous Improvement	✘	The ES&H Management Planning process does not specifically call for continuous improvement

Supporting Justification *(continued)*

Mgmt System / Elements	OSHA Process Safety Management (PSM) (29 CFR 1910.112)	
POLICY		
Management commitment	✔	The Regulation does not specifically call out management commitment or line management responsibility, but lays all responsibility for compliance with "the employer." (1910.119(d))
Line management responsibility	✔	
PLAN		
Communication	✔	". . . the employer shall complete a compilation of written process safety information. . . .[which shall] enable the employer and the employees involved in operating the process to identify and understand the hazards posed by those processes." (1910.119(d)). Findings and actions are to be communicated (19190.119 (e) (5).
Documentation	✔	
Employee involvement	✔	"Employers shall consult with employees and their representatives . . . " (1910.119 (c))
Stakeholder involvement	✘	Although the regulations require employee involvement, they do not require involvement of other stakeholders.
Define scope of work	✘	The regulations do not require that a specific scope of work or alternatives be identified.
Consider alternatives	✘	
Analyze hazards, impacts	✔	"This process safety information shall include information pertaining to the hazards. . . ." (1910.119(d))
Mitigate hazards / impacts	✔	"The employer shall establish a system to promptly address the team's findings [regarding potential process hazards.] (1910.119(e) (5))
ID standards / requirements	✔	The regulations require a check against "good engineering practices" (1910.119(d)(ii))
Risk-based prioritization	✔	The regulations are based on a risk-based approach.
Allocate resources	✘	The regulations do not discuss the need to allocate and manage resources.
DO		
Integration	✘	The regulations do not discuss the need to integrate.
Roles & responsibilities	✔	"The employer shall develop and implement written operating procedures that provide clear instructions. . . ." (1919.119(f))
Start-up review / authorization	✔	"operating procedures shall address . . . initial startup" (1910.119 (f) (i) (A))
Competence	✔	"Each employee. . . shall be trained. . . ." (1910.119 (g))
Oversight	✔	"Employers shall certify that they have evaluated compliance . . . ." (1910.119 (o))
Tailored controls	✔	operating procedures (1910.119 (f))
Perform work safely	✔	The purpose of the regs is to prevent or minimize the consequences of catastrophic releases.
Emergency preparedness	✔	operating procedures must address emergency situations (1910.119 (f) (i) (E). Emergency planning and response is also required (1910.119 (n))

Mgmt System / Elements	OSHA Process Safety Management (PSM) (29 CFR 1910.112)	
CHECK		
Performance goals	✘	The regulation does not establish the need to set goals and measures.
Performance measurement	✘	
Self assessment	✔	Compliance audits are required (1910.119 (o))
Independent assessment	✔	
ACT		
Provide feedback on controls	✔	Employer shall promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that the deficiencies have been corrected." (1910.119 (o) (4))
Compare results to goals/measures	✔	
Continuous Improvement	✔	

Supporting Justification *(continued)*

Mgmt System / Elements	EPA Chemical Risk Management Program (RMP) (40 CFR 68)	
POLICY		
Management commitment	✔	"The owner or operator shall assign a qualified person or position that has the overall responsibility for the development, implementation, and integration of the risk management program elements." (40 CFR 68.15) Under the Clean Air Act Amendments of 1990, Title III: Hazardous Air Pollutants, Section 112(r) (1), facility owners and operators have a "general duty" to identify hazards and maintain a safe facility, and minimize consequences or a release. This is a baseline requirement requiring management commitment.
Line management responsibility	✔	
PLAN		
Communication	✔	"The owner or operator shall prepare written operating procedures that provide clear instructions or steps for safely conducting activities . . . ." (68.52) Other documentation requirements are specified in 68.39.
Documentation	✔	
Employee involvement	✔	"The owner or operator shall develop a written plan of action regarding the implementation of the employee participation . . . ." (40 CFR 68.83)
Stakeholder involvement	✔	"Upon request of the local emergency planning committee or emergency response officials, the owner or operator shall promptly provide to the local emergency response officials information necessary for developing and implementing the community emergency response plan." (68.95(c))
Define scope of work	✘	The regulations do no focus on defining the scope of work or alternatives.
Consider alternatives	✘	
Analyze hazards, impacts	✔	"The owner or operator shall perform an initial process hazard analysis (hazard evaluation) . . . ." (68.67)
Mitigate hazards / impacts	✔	"The owner or operator shall establish a system to promptly address the team's findings and recommendations. . . . " (68.67 (e))
ID standards / requirements	✔	The regulations require compliance audits (40 CFR 68.79) which would include a review of applicable standards / requirements.
Risk-based prioritization	✔	The regulations define three separate program levels based on past accidents (level of risk).
Allocate resources	✔	"The owner or operator shall assign a qualified person or position that has the overall responsibility for the development, implementation, and integration of the risk management program elements." (40 CFR 68.15)
DO		
Integration	✔	"The owner or operator shall assign a qualified person or position that has the overall responsibility for the development, implementation, and **integration** of the risk management program elements." (40 CFR 68.15) [emphasis added]
Roles & responsibilities	✔	"When responsibility for implementing individual requirements of this part is assigned to persons other than the person identified under paragraph (b) of this section, the names or positions of these people shall be documented and the lines of authority defined through an organization chart or similar document." (40 CFR 68.15 (c))
Start-up review / authorization	✔	"The owner or operator shall develop and implement written operating procedures that provide . . . initial startup . . . . " (68.69)
Competence	✔	The regulations provide for initial training, refresher training, and training documentation (68.71).

Mgmt System / Elements	EPA Chemical Risk Management Program (RMP) (40 CFR 68)	
Oversight	✔	"The owner or operator shall certify that they have evaluated compliance with the provisions of this subpart at least every three years. . . ." (68.58)
Tailored controls	✔	"The owner or operator shall perform an initial process hazard analysis (hazard evaluation) . . . .The process hazard analysis shall be appropriate to the complexity of the process. . . ." (68.67)
Perform work safely	✔	The regulations establish requirements for the prevention of accidental releases.
Emergency preparedness	✔	Emergency response programs are to be developed under 40 CFR 68.95.
CHECK		
Performance goals	✔	Requirements for compliance audits are found at 40 CFR 68.58 and .79. Audits are to be conducted every three years. Accident history is to be updated every 5 years.
Performance measurement	✔	
Self assessment	✔	
Independent assessment	✔	
ACT		
Provide feedback on controls	✔	The owner or operator shall document the results of the review and ensure that problems identified are resolved in a timely manner." (68.50(c))
Compare results to goals/measures	✔	
Continuous Improvement	✔	

Supporting Justification *(continued)*

Mgmt System / Elements	ISO 14001 Environmental Management System (Note: references are section numbers from ISO 14001, first edition 1996-09-01(ISO 14001:1996(E). References with the letter "A" are from the Annex A, ISO 14001:1996(E))	
POLICY		
Management commitment	✔	4.2"Top management shall define the organization's environmental policy"
Line management responsibility	✔	A.4.1 "Environmental responsibilities therefore should not be seen as confined to the environmental function, but may also include other areas of an organization, such as operational management . . . ."
PLAN		
Communication	✔	4.4.3 " . . . the organization shall establish and maintain procedures for (a) internal communication . . . (b) receiving, documenting and responding to relevant communication from external interested parties."
Documentation	✔	4.4.5 ". . . establish and maintain procedures for controlling all documents. . . ."
Employee involvement	✔	A.4.1 "The successful implementation of an environmental management system calls for the commitment of all employees of the organization."
Stakeholder involvement	✔	4.3.3 "an organization shall consider the . . . views of interested parties." 4.4.3 " . . . the organization shall establish and maintain procedures for. . . receiving, documenting and responding to relevant communication from external interested parties." Note: ISO 14001 provides a management systems framework and does not necessarily require compliance with all applicable environmental regulations to be registered to ISO 14001. The EPA National Enforcement Investigations Center has issued a statement, "*Compliance-Focused Environmental Management System – Enforcement Agreement Guidance*" (August 1997) which reflects EPA concerns about the limitations of ISO 14001, and the need for more explicit commitments to compliance management, pollution prevention, and public involvement/community outreach.
Define scope of work	✔	4.3.3 "establish and maintain documented environmental objectives and targets. . . ."
Consider alternatives	✔	4.3.3 "When establishing. . . objectives. . . consider technological options . . . financial, operational and business requirements. . . ."
Analyze hazards, impacts	✔	4.3.1 ". . . identify the environmental aspects of its activities, products or services . . . in order to determine those which have or can have significant impacts on the environment."
Mitigate hazards / impacts	✔	4.2". . . the organization's environmental policy . . (b) includes a commitment to continual improvement and prevention of pollution." where 3.13 defines 'prevention of pollution'' as "use of processes, practices, materials or products that avoid, reduce or control pollution."
ID standards / requirements	✔	4.3.2 ". . . establish and maintain a procedure to identify and have access to legal and other requirements to which the organization subscribes. . . ."
Risk-based prioritization	✔	ISO 14001 requires identification of environmental aspects and impacts, and a determination of those aspects and impact that are "significant." This process would normally include some risk-based approach to determine which aspects are significant.
Allocate resources	✔	4.4.1 " Management shall provide resources essential to the implementation and control of the environmental management system Resources include human resources and specialized skills, technology and financial resources."

Mgmt System / Elements	ISO 14001 Environmental Management System (Note: references are section numbers from ISO 14001, first edition 1996-09-01(ISO 14001:1996(E). References with the letter "A" are from the Annex A, ISO 14001:1996(E))	
DO		
Integration	✘	ISO 14001 integrates "E" with the business process, but does not explicitly call for integration of "E" with "S&H." A.1 "Integration of environmental matters with the overall management system can contribute to the effective implementation of the environmental management system." However, ISO 14001 "is not intended to address, and does not include requirements for, aspects of occupational health and safety management; however, it does not seek to discourage an organization from developing integration of such management system elements." (ISO 14001:1996(E) Introduction, p. vii)
Roles & responsibilities	✔	4.4.1 "Roles, responsibilities and authorities shall be defined, documented and communicated in order to facilitate effective environmental management."
Start-up review / authorization	✔	4.4.6 "The organization shall identify those operations and activities that are associated with the identified significant environmental aspects. . . . The organization shall plan these activities, including maintenance, in order to ensure that they are carried out under specified conditions. . . ."
Competence	✔	4.4.2 "Personnel performing the tasks which can cause significant environmental impacts shall be competent on the basis of appropriate education, training and/or experience."
Oversight	✔	4.5.1. "The organization shall establish and maintain a documented procedure for periodically evaluating compliance with relevant environmental legislation and regulations." 4.5.4. "The organization shall establish and maintain (a) programme(s) and procedures for periodic environmental management system audits . . . ."
Tailored controls	✔	4.4.6. "The organization shall identify those operations and activities that are associated with the identified significant environmental aspects. . . ."
Perform work safely	✘	The ISO 14001 Environmental Management System focuses on continuous improvement in reducing environmental impacts and adhering to an environmental policy and requires identification of significant environmental impacts which could result from an organization's activities (4.3.1, and A.3.1). While work is performed within these environmental controls (to prevent environmental impacts) it is not the focus of ISO 14001 to do work safely. In addition, while DOE ISMS defines "safety" as "ES&H," ISO 14001 clearly only focuses on the "E" component and does not actively integrate "S&H" with "E."
Emergency preparedness	✔	4.4.7 "The organization shall establish and maintain procedures to identify potential for and respond to accidents and emergency situations. . . ."
CHECK		
Performance goals	✔	3.7 "environmental objective: overall environmental goal." 3.10. "Environmental target: detailed performance requirement."
Performance measurement	✔	4.3.4. "The organization shall establish and maintain (a) programme(s) for achieving its objectives and targets."
Self assessment	✔	A.5.4. "Audits may be performed by personnel from within the organization and/or by external persons selected by the organization."
Independent assessment	✔	
ACT		
Provide feedback on controls	✔	A.6. ". . . the organization's management should review and evaluate the environmental management system. . . . Reviews should include (a) results from audits, (b) the extent to which objectives and targets have been met, (c) the continuing suitability of the environmental management system in relation to changing conditions and information; and (d) concerns amongst relevant interested parties. Observations, conclusions and recommendations should be documented for necessary action."

Mgmt System / Elements	ISO 14001 Environmental Management System (Note: references are section numbers from ISO 14001, first edition 1996-09-01(ISO 14001:1996(E). References with the letter "A" are from the Annex A, ISO 14001:1996(E))	
Compare results to goals/measures	✔	
Continuous Improvement	✔	A.1 "The environmental management system provides a structured process for the achievement of continual improvement. . . ."

Supporting Justification *(continued)*

Mgmt System / Elements	***EPA Code of Environmental Management Principles (CEMP)*** ***(References are from the "Implementation Guide for the Code of Environmental Management Principles for Federal Agencies (CEMP)" March 1997, (EPA-315-B-97-001)***	
POLICY		
Management commitment	✔	Principle 1. " Management Commitment: The agency makes a written top-management commitment to improved environmental performance . . . " (page 1)
Line management responsibility	✔	Principle 4. "The fourth Principle concerns the need to lay out the organizational structure and lines of responsibility. . . ." (Page 33)
Plan		
Communication	✔	Principle 3. Section 3.3. "The agency develops and implements systems that encourage efficient management of environmentally-related information, communication, and documentation." (Page 29).
Documentation	✔	
Employee involvement	✔	Principle 4, Section 4.1. "The agency ensures that personnel are assigned the necessary authority, accountability, and responsibilities to address environmental performance, and that employee input is solicited."
Stakeholder involvement	✔	Principle 1, Section 1.1.1 "Communicate with stakeholders, including regulatory agencies, to identify needs, expectations, and concerns." Principle 3, Section 3.3. "Develop a communications network to report environmental performance to stakeholders. . . ." Develop a public outreach program that can encourage public participation, where appropriate." (Page 32)
Define scope of work	✘	The EPA CEMP does not focus on defining specific job tasks.
Consider alternatives	✔	Principle 1, Section 1.1.2. ". . . integrate an environmental viewpoint into planning and decision-making activities. . . ." "This involves incorporating environmental performance into decision-making processes along with factors such as cost, efficiency, and productivity." (Page 16) Principle 2, section 2.3. CEMP encourages pollution prevention to evaluate product life cycles and seek alternatives that avoid and/or prevent pollution.
Analyze hazards, impacts	✔	Principle 1, Section 1.2. "The agency strives to facilitate a culture of environmental stewardship and sustainable development. "Environmental Stewardship" refers to the concept that society should recognize the impacts of its activities on environmental conditions and should adopt practices that eliminate or reduce negative environmental impacts." (Page 17).
Mitigate hazards / impacts	✔	
ID standards / requirements	✔	Principle 2, Section 2.1. "The agency institutes support programs to ensure compliance with environmental regulations and encourages setting goals beyond compliance." (Page 20).

Mgmt System / *Elements*	*EPA Code of Environmental Management Principles (CEMP)* *(References are from the "Implementation Guide for the Code of Environmental Management Principles for Federal Agencies (CEMP)" March 1997, (EPA-315-B-97-001)*	
Risk-based prioritization	✔	Principle 1, section 1.1.2. ". . . integrate an environmental viewpoint into planning and decision-making activities. . . ." (Page 16) "Appropriate steps . . . could include: identify environmental liabilities and risks." (Page 17) Principle 2. "Aggressive pollution prevention strategies will also be central to maintaining compliance, improving environmental performance, reducing risks, and cutting costs." (Page 20)
Allocate resources	✔	Principle 1, Section 1.1. "Management sets the priorities, assigns key personnel, and allocates funding for agency activities." (Page 15) — see also, Principle 3, Enabling Systems (page 27)

Mgmt System / *Elements*		*EPA Code of Environmental Management Principles (CEMP)* *(References are from the "Implementation Guide for the Code of Environmental Management Principles for Federal Agencies (CEMP)" March 1997, (EPA-315-B-97-001)*
Do		
Integration	✔	Principle 1, Section 1.1.2. "The agency integrates the environmental management system throughout its operations, including its funding and staffing requirements, and reaches out to other organizations." (Page 16)
Roles & responsibilities	✔	Principle 1, Section 1.1.2. "Management should institutionalize the environmental program within organizational units at all levels. . . ." (Page 16) Principle 4, Section 4.1. "The agency ensures that personnel are assigned the necessary authority, accountability, and responsibilities to address environmental performance. . . ." (Page 33).
Start-up review / authorization	✔	Principle 2, Section 2.1. "The agency institutes support programs to ensure compliance with environmental regulations . . . ." ". . . non-compliance with regulations and established procedures is unacceptable and injurious to the operation. . . ." (Page 20)
Competence	✔	Principle 3, Section 3.1. "The agency ensures that personnel are fully trained to carry out the environmental responsibilities of their positions." (Page 27).
Oversight	✔	Principle 2, Section 2.1. "Appropriate steps to ensure compliance could include: develop an independent compliance group. . . ." (Page 21)
Tailored controls	✔	Principle 2, Section 2.1. ". . . the objective of a compliance program is not to set up obstacles that prevent meaningful work from being accomplished, but to guide the organization through complex and often uncertain terrain to the successful completion of tasks." (This seems to imply that the compliance program is tailored to the work to be performed). (Page 21)
Perform work safely	✘	The focus of the CEMP is not to do work safely but to assist agencies to move toward responsible environmental management.
Emergency preparedness	✔	Principle 2, Section 2.2 "The agency develops and implements a program to address contingency planning and emergency response situations." (Page 22).
Check		
Performance goals	✔	Principle 5, Section 5.1 "The agency develops a program to assess environmental performance and analyze information resulting from these evaluations to identify areas in which performance is or is likely to become substandard." (Page 35).
Performance measurement	✔	
Self assessment	✔	Principle 5, Section 5.1.1. "Assessments can be performed by members of the organization or by an outside group brought in for the specific purpose of evaluating the organization." (Page 35).
Independent assessment	✔	
Act		
Provide feedback on controls	✔	Principle 5. "The agency develops and implements a program to assess progress toward meeting its environmental goals and uses the results to improve environmental performance." (Page 35).
Compare results to goals/measures	✔	
Continuous Improvement	✔	

Supporting Justification *(continued)*

Mgmt System Elements		*Responsible Care® Program of the Chemical Manufacturer's Association*
POLICY		
Management commitment	✔	Element 7, Executive Leadership Groups. "Senior level support for Responsible Care continues to be an essential ingredient of the initiative's success." (Overview brochure) Element 2, Codes of Management Practices -- Product Stewardship. "Each company shall have an ongoing product stewardship that . . . [d]emonstrates senior management leadership through written policy, active participation and communication." (Page 2 of explanatory information, "Product Stewardship Code of Management Practices")
Line management responsibility	✔	Element 2, Codes of Management Practices - Employee Health and Safety. "Commitment by all levels of management to protecting and promoting the health and safety of people. . . ." (Page 2 of explanatory information, Employee Health and Safety Code of Management Practices).
PLAN		
Communication	✔	Element 2, Codes of Management Practices - Employee Health and Safety. "These practices provide a multidisciplinary means to . . . foster communication on health and safety issues." (Page 1 of explanatory information, Employee Health and Safety Code of Management Practices). Management Practice 17: "Communication of health and safety information . . . ."
Documentation	✔	Element 2, Codes of Management Practices - Employee Health and Safety. Management Practice 4. "Written, up-to-date health and safety programs and procedures appropriate to the facility." (Page 2 of explanatory information, Employee Health and Safety Code of Management Practices).
Employee involvement	✔	Element 2, Codes of Management Practices - Employee Health and Safety. Management Practice 2. "Opportunities for employees to participate in developing, implementing, and reviewing health and safety programs." (Page 2 of explanatory information, Employee Health and Safety Code of Management Practices).
Stakeholder involvement	✔	Element 1, Guiding Principles, "To recognize and respond to community concerns about chemicals and our operations." Element 2, Codes of Management Practices - Community Awareness and Emergency Response. "The goal of the Community Awareness and Emergency Response (CAER) Code of Management Practices is to . . . foster community right-to-know. It demands a commitment to openness and community dialogue." (Page 1 of explanatory information, "Community Awareness and Emergency Response Code of Management Practices.")
Define scope of work	✔	Element 1, Guiding Principles: "To make health, safety and environment considerations a priority in our planning for all existing and new products and processes." Element 2, Codes of Management Practices - Product Stewardship. ". . . to make health, safety and environmental protection an integral part of designing, manufacturing, marketing, distributing, using, recycling and disposing of our products." (Page 1, explanatory information, "Product Stewardship Code of Management Practices.")
Consider alternatives	✔	Element 2, Code of Management Practices - Employee Health and Safety. "Mechanisms for reviewing the design and modification of facilities and job tasks, taking into account the following hierarchy of controls: inherent safe design, material substitution, engineering control, administrative controls, and personal protective equipment." (Page 2, explanatory information, "Employee Health and Safety Code of Management Practices." Management Practice 11.)

Mgmt System / *Elements*	*Responsible Care® Program of the Chemical Manufacturer's Association*	
Analyze hazards, impacts	✔	Element 2, Code of Management Practices - Employee Health and Safety. "Methods to identify and evaluate potential health and safety hazards in planned or existing facilities, including facilities to be modified." (Page 2, explanatory information, "Employee Health and Safety Code of Management Practices." Management Practice 7.)
Mitigate hazards / impacts	✔	Element 2, Code of Management Practices - Employee Health and Safety. "Means to verify that health and safety programs and procedures are effective and that actual practices are consistent with these programs and procedures." (Page 2, explanatory information, "Employee Health and Safety Code of Management Practices." Management Practice 5.)
ID standards / requirements	✔	Element 2, Code of Management Practices - Distribution. "A process of monitoring changes and interpretation of new and existing regulations and industry standards for their applicability . . . ." (Page 2, explanatory information, Distribution Code of Management Practices." Management Practice 2.1.)
Risk-based prioritization	✔	Element 2, Codes of Management Practices - Product Stewardship. ". . . to make health, safety and environmental protection an integral part of designing, manufacturing, marketing, distributing, using, recycling and disposing of our products." (Page 1, explanatory information, "Product Stewardship Code of Management Practices.")
Allocate resources	✔	Element 2, Codes of Management Practices - Product Stewardship. "Establishes a system to identify, document, and implement health, safety and environmental risk-management actions appropriate to the product risk." (Page 2, explanatory information, "Product Stewardship Code of Management Practices." Management Practice 6.)
DO		
Integration	✔	Element 2, Codes of Management Practices - Product Stewardship. "The purpose of the Product Stewardship Code of Management Practices is to make health, safety and environmental protection an integral part of designing, manufacturing, marketing, distributing, using, recycling and disposing of our products." (Page 1, explanatory information, "Product Stewardship Code of Management Practices." - Purpose and Scope.)
Roles & responsibilities	✔	Element 2, Codes of Management Practices - Product Stewardship. "Establishes goals and responsibilities for implementing product stewardship throughout the organization." (Page 2, explanatory information, "Product Stewardship Code of Management Practices." -Management Practice 2.)
Start-up review / authorization	✔	Element 2, Codes of Management Practices - Employee Health and Safety. "Methods to identify and evaluate potential health and safety hazards in planned or existing facilities, including facilities to be modified." "Mechanisms for reviewing the design and modification of facilities and job tasks. . . ." (Page 1, explanatory information, "Employee Health and Safety Codes of Management Practices" Management Practices 7, and 11 - 13.
Competence	✔	Element 2, Codes of Management Practices - Product Stewardship. "Educates and trains employees, based on job function, on proper handling, recycling, use, and disposal of products and known product uses." (Page 2, explanatory information, "Product Stewardship Code of Management Practices." - Management Practice 8.)
Oversight	✔	Element 6, Management Systems Verification. "The process provides participating companies with an external view of the effectiveness of their management system. . . ." (Introductory brochure.)
Tailored controls	✔	Element 2, Codes of Management Practices - Product Stewardship. "Establishes a system to identify, document, and implement health, safety and environmental risk-management actions appropriate to the product risk." (Page 2, explanatory information, "Product Stewardship Code of Management Practices." - Management Practice 6.)

Mgmt System / *Elements*	*Responsible Care® Program of the Chemical Manufacturer's Association*	
Perform work safely	✔	Element 1, Guiding Principles. "To operate our plants and facilities in a manner that protects the environment and the health and safety of our employees and the public." (Introductory brochure).
Emergency preparedness	✔	Element 2, Codes of Management Practices - Community Awareness and Emergency Response (CAER) Code.
CHECK		
Performance goals	✔	Element 2, Codes of Management Practices - Product Stewardship. Establishes goals and responsibilities for implementing product stewardship throughout the organization. Measures performance against these goals." (Page 2, explanatory information, "Product Stewardship Code of Management Practices." - Management Practice 2.)
Performance measurement	✔	
Self assessment	✔	Element 4, Self Evaluation
Independent assessment	✔	One of the four building blocks of Responsible Care is External Evaluation. Element 6, Management Systems Verification, calls for ". . . an external view of the effectiveness of their management systems . . . and helps demonstrate the integrity of the initiative to key audiences." (From introductory brochure).
ACT		
Provide feedback on controls	✔	Element 4, Self-Evaluations; Element 5, Measures of Performance; and Element 6, Management Systems Verification.
Compare results to goals/measures	✔	
Continuous Improvement	✔	Continuous improvement is at the core of the 4 basic building blocks for the Responsible Care program. "Continuous Improvement and the call for "Action, Not Words" permeate all the other challenges." (Page 37, *Responsible Care In Action, 1993 - 1994 Progress Report*.)

Supporting Justification *(continued)*

Mgmt System / *Elements*		***DOE / OSHA Voluntary Protection Program (VPP)*** **(Page number references are from DOE EH VPP guidance, "Program Elements" February 1994)**
POLICY		
Management commitment	✔	Management leadership is one of the five core elements. (DOE EH VPP guidance, "Program Elements" February 1994. Element 1; page 7).
Line management responsibility	✔	"Line Accountability" (Element 1 (b) (4); page 8)
PLAN		
Communication	✔	goals and objectives must be communicated (Element 1 (a) (2); page 8)
Documentation	✔	A written health and safety program is required (Element 1 (b); page 8).
Employee involvement	✔	Employee involvement is the second of five elements (Element 2; page 10)
Stakeholder involvement	✘	Although employee involvement is integral to VPP, involvement of other (external) stakeholders is not.
Define scope of work	✔	"All planned, new , or newly acquired facilities, equipment, materials, and processes should be analyzed before thy are used. . . ." (Element 3 (a); page 11)
Consider alternatives	✔	"Means for eliminating or controlling hazards are to be implemented. . . . process and /or material substitution." (Element 4 (a); page 13)
Analyze hazards, impacts	✔	Worksite analysis is the third of five primary elements (Element 3; page 11)
Mitigate hazards / impacts	✔	"Means for eliminating or controlling hazards are to be implemented. . . .engineering controls, administrative controls, and personal protective equipment." (Element 4 (a); page 13)
ID standards / requirements	✔	VPP requires use of nationally recognized procedures for sampling, testing, and analysis (Element 3 (b) (2); page 12). In addition, because VPP focuses on excellence, all applicable standards and requirements must be met at a minimum to achieve excellence or go beyond compliance.
Risk-based prioritization	✘	VPP does not mention the need for risk-based prioritization.
Allocate resources	✔	"Responsible personnel must have adequate authority and resources to perform the desired tasks." (Element 1 (b) (3); page 8)
DO		
Integration	✘	". . . authority and responsibility for employee health and safety must be integrated with the management system of the organization. . . . " (Element 1 (a); page 7) However, VPP only address safety and health and does integrate with environmental concerns.
Roles & responsibilities	✔	Responsibility for all aspects of the safety and health program must be assigned and communicated. . . ." (Element 1 (b) (2); page 8)
Authorization	✔	"Responsible personnel must have adequate authority and resources to perform the desired tasks." (Element 1 (b) (3); page 8)
Competence	✔	Training is necessary to implement management's commitment to prevent exposure to hazards." (Element 5; page 14)
Oversight	✔	"There must be ongoing monitoring . . . ." (Element 4 (c) (e); page 14)
Tailored controls	✔	"Comprehensive health and safety surveys should be conducted . . . appropriate for the nature of the workplace operations." (Element 3 (b), Page 12)

Mgmt System / *Elements*	*DOE / OSHA Voluntary Protection Program (VPP)* **(Page number references are from DOE EH VPP guidance, "Program Elements" February 1994)**	
Perform work safely	✔	Training is necessary to implement management's commitment **to prevent exposure to hazards**." [emphasis added] (Element 5; page 14)
Emergency preparedness	✔	"Procedures for response to emergencies must be written and communicated . . . ." (Element 4 (g); page 14)
CHECK		
Performance goals	✔	"There should be an established and communicated goal for the safety and health program and objectives for meeting the goal so the desired results and the planned measurements to achieve those results are clearly understood." (Element 1 (a) (2); page 8).
Performance measurement	✔	
Self assessment	✔	"The applicant/participant must have a system for evaluating the operation of the safety and health program to judge success in meeting the goal and objective to that those responsible can determine and implement changes needed to improve employee safety and health protection." (Element 1, (8)); page 9) "The evaluation may be conducted by competent corporate or site personnel, or by third party from the private sector." (Element 1 (8) (c); page 10)
Independent assessment	✔	
ACT		
Provide feedback on controls	✔	"The applicant/participant must have a system for evaluating the operation of the safety and health program to judge success in meeting the goal and objective to that those responsible can determine and implement changes needed to improve employee safety and health protection. The system must provide for an annual, written, narrative report with written recommendations for improvements and documented timely follow-up. The evaluation must assess the effectiveness of each element." (Element 1, (8)); page 9)
Compare results to goals/measures	✔	
Continuous Improvement	✔	

Supporting Justification *(continued)*

Mgmt System / *Elements*		***Risk Management Framework of the Presidential / Congressional Commission on Risk Assessment and Risk Management*** **(References are from the Final Reports , Volumes 1 and 2, published by the Commission)** **Note: Also refer to "DOE's Principles for Using Risk Analysis." January 25, 1995 (http://www.em.doe.gov/irm/principl.html)**
POLICY		
Management commitment	✘	Although "The Commission's Framework is designed to help all types of risk managers . . . make good risk management decisions." (Volume 1, Final Report, p.3); it does not specifically call for a management commitment to implement the framework.
Line management responsibility	✘	Although the Framework "is designed to help all types of risk manager" it does not squarely place responsibility on line managers.
PLAN		
Communication	✔	"In communicating with various audiences about risks, risk assessors and risk managers must seek a two-way interaction . . . ." (Volume 2, page iii)
Documentation	✘	The Commission's Framework does not specify the need to keep documentation.
Employee involvement	✘	The Commission's Framework place a big emphasis on stakeholder involvement, however, it does not specify the need to involve employees (although employees could be considered a stakeholder.)
Stakeholder involvement	✔	Stakeholder involvement is central to the Commission's Framework (Vol 1, p 15)
Define scope of work	✔	The first step of the Commission's Framework is to define and characterize the problem (Vol. 1, p. 7).
Consider alternatives	✔	The third step in the Commission's Framework is to examine options. (Vol. 1, p. 29).
Analyze hazards, impacts	✔	"Analysis must consider whether an option may cause any adverse consequences." (Vol 1, page 35)
Mitigate hazards / impacts	✔	The fifth step in the Commission's Framework is to take action. (Volume 1, page 41).
ID standards / requirements	✔	"Thus [risk management] decisions may reflect negotiation and compromise, so long as statutory requirements and intent are met." (Vol 1, page 37)
Risk-based prioritization	✔	"Analysis must consider whether an option may cause any adverse consequences. One of the most important is the potential for an option to increase one type of risk while reducing the risk of concern. . . . Thus, tradeoffs among different risks must be identified and considered." (Vol 1, page 35)
Allocate resources	*?*	The Commission's Framework does not specifically discuss resource allocation. However, the approach behind the system is to look at the entire problem, nor a narrow slice, and treat it holistically. By doing so, it may be possible to develop a solution that does the most good for the least cost. In an indirect way, this concept addresses allocation of scarce resources.

Mgmt System / *Elements*		*Risk Management Framework of the Presidential / Congressional Commission on Risk Assessment and Risk Management* **(References are from the Final Reports , Volumes 1 and 2, published by the Commission)** **Note: Also refer to "DOE's Principles for Using Risk Analysis." January 25, 1995 (http://www.em.doe.gov/irm/principl.html)**
DO		
Integration	✘	Although the Commission's Risk Management Framework contains the step, "Taking Action" (vol 1, page 41), the step focuses on implementation of the risk management decision and does not specify the level of detail associated with the goal of doing work safely.
Roles & responsibilities	✘	
Start-up review / authorization	✘	
Competence	✘	
Oversight	✘	
Tailored controls	✘	
Perform work safely	✘	
Emergency preparedness	✘	
CHECK		
Performance goals	✔	The final step in the Commission's Framework is evaluating the results, (Vol 1, page 45).
Performance measurement	✔	
Self assessment	✔	
Independent assessment	✔	
ACT		
Provide feedback on controls	✔	The final step in the Commission's Framework is evaluating the results, (Vol 1, page 45).
Compare results to goals/measures	✔	
Continuous Improvement	✔	

Attachment 2

Description of System Elements

DESCRIPTION OF SYSTEM ELEMENTS

POLICY

- **Management commitment** - Management shall define the organization's ES&H policy and ensure that it: is appropriate to the nature of the hazards; includes a commitment to continual improvements; includes a commitment to comply with relevant ES&H to include waste minimization / pollution prevention, legislation/regulations/standards; is documented, implemented and communicated to all employees; and is available to the public.

- **Line Management Responsibility** - Line management is directly responsible for protection of the public, the workers and the environment. As a complement to line management, the Department's Office of Environment, Safety and Health provides ES&H policy, enforcement, and independent oversight.

PLAN

- **Communication** - ES&H policies and plans are communicated throughout the organization and to stakeholders.

- **Documentation** - The extent of the documentation shall be tailored to the complexity and hazards associated with the work. At a minimum, documentation shall include the ES&H system, itself, change control procedures, roles and responsibilities, and operating procedures. Documentation shall be dated and identify the responsible authority.

- **Employee involvement** - Employees must be part of the work planning to identify hazards and opportunities for improvements, and must have access to information regarding all element of the ES&H management system.

- **Stakeholder involvement** - Stakeholders are defined as those individuals and groups in the public and private sectors who are interested in and/or affected by the Department's activities and decisions (from DOE P 1210.1, "Public Participation"). Stakeholder involvement means soliciting meaningful input of those affected as appropriate.

- **Define scope of work** - Missions are translated into work, expectations are set, tasks are identified and prioritized, and resources are allocated.

- **Consider alternatives** - Evaluate the reasonable alternatives for accomplishing the mission when translating mission into work, considering alternatives that might offer reduced safety risk.

- **Analyze hazards / impacts** - Potential hazards to workers, the public, and the environment associated with the work shall be identified, analyzed, and categorized. Impacts that may results from these hazards shall be evaluated and understood.

- **Mitigate hazards/impacts** - Identified hazards and associated impacts should be eliminate or avoided where possible, or reduced or otherwise mitigated to include implementation of pollution prevention measures.

- **Identify standards / requirements** - Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.

- **Risk-based prioritization** - Operations/projects that are to be accomplished to reduce risk shall be prioritized based on a relative risk-reduction model.

- **Allocate resources** - Resources shall be effectively allocated to address safety, programmatic and operational considerations.

DO

- **Integration** - ES&H should be integrated into the contractor's business processes for work planning, budgeting, authorization, execution, and change control. This requires integration within each line organization and integration among the different organizational elements.

- **Roles and responsibilities -** Clear and unambiguous lines of authority and responsibilities for ensuring safety are established and maintained at all organizational levels within the Department and its contractors.

- **Start-up review/authorization -** Perform safety review for new or modified facilities, or for a change in the hazard and/or complexity of the work being performed before work is initiated. For high hazard operations, the process should clearly identify whether an independent assessment of the operation readiness is required. Proper authorization shall be obtained prior to initiation of operations.

- **Competence -** Personnel shall possess the experience, knowledge, skills and abilities that are necessary to discharge their responsibilities.

- **Oversight -** Line management is responsible for oversight including oversight of subcontractors, to assure that work is performed within the approved controls.

- **Tailored controls -** Administrative and engineering controls to prevent and/or mitigate hazards shall be tailored to address the specific hazards associated with the work being performed. This includes maintenance and inspection of equipment and devices necessary to prevent accidents and unplanned events/releases.

- **Perform work safely** - Work is performed in accordance with ES&H controls.

- **Emergency Preparedness -** Emergency preparedness, response, and mitigation plans and procedures are in place and have been practiced in case of an unplanned event. Emergency preparedness includes coordination with off-site local public officials. Emphasis should be on designing the work and / or controls to reduce or eliminate the hazards and to prevent accidents and unplanned releases and exposures.

CHECK

- **Performance goals** - The goal is to define work and allocate resources so that the work is done safely and contributes to the accomplishment of the mission.

- **Performance measurements** - Quantitative parameters used to determine the degree of performance in achieving the stated goal.

- **Self assessments** - A systematic evaluation of the organizations performance, performed by people involved in the activity, with the objective of finding opportunities for improvements.

- **Independent assessment** - Oversight conducted by an organization at "arms length" to the activity. EH is the major element for conducting independent oversight of ES&H activities.

ACT

- **Provide feedback on controls** - Feedback information on the adequacy of controls is gathered, and opportunities for improving the definition and planning of work are identified and implemented.

- **Compare results to goals/measurements** - Results of assessments are compared to goals/measurements to determine if improvements are needed.

- **Continuous improvement** - Process of enhancing the ES&H management system based on measurements and analysis of results produced by the system with the purpose of achieving improvements in ES&H performance.

Attachment 3

Other ES&H Management Systems Reviewed

OTHER ES&H MANAGEMENT SYSTEMS REVIEWED

These systems were reviewed for unique elements that could be incorporated into the matrix. These were not specifically included as a separate section in the matrix, but were used as reference material to help formulate the approach taken in this paper.

- DOE Enhanced Work Planning - The DOE Enhanced Work Planning (EWP) effort was incorporated into the major element, "Plan" in the matrix, rather than being listed as a separate evaluation column. Additional information on DOE EWP is available through Rick Jones (EH) at (301) 903-6061.

- British Standard BS 8800, "Guide to Occupational Health and Safety Management Systems." - The primary elements of BS 8800 were incorporated, however BS 8800 was not specifically listed as a separate column in the matrix because it is not an international standard. However, DOE facilities are not prohibited from using BS 8800 or applying its principles. BS 8800 is available for purchase from the British Standards Institute (BSI) through Global Engineering Documents, 15 Inverness Way East, Englewood, Colorado 80112-5776 or by calling (800) 624-3974. A review copy is available through Anthony Neglia, DP-45, (301) 903-3531.

- British Standard BS 7750, "Specification for Environmental Management Systems." - The primary elements of BS 7750 were incorporated, however BS 7750 was not specifically listed as a separate column in the matrix because it is not an international standard. However, DOE facilities are not prohibited from using BS 7750 or applying its principles. BS 7750 is available for purchase from the British Standards Institute (BSI) through Global Engineering Documents, 15 Inverness Way East, Englewood, Colorado 80112-5776 or by calling (800) 624-3974. A review copy is available through Anthony Neglia, DP-45, (301) 903-3531.

- NSF Standard 110, "Environmental Management Systems -- Guiding Principles and Generic Requirements." - The NSF standard was under develop in 1995 and was superseded by the International Organization for Standardization (ISO) work on ISO 14000. NSF agreed not to proceed with their standard and to let ISO 14001 take the lead role as the international standard for environmental management systems. Copies of the NSF documents may be obtained through NSF by calling Ms. Petie Davis of NSF at (313) 332-7333. Note: NSF International is a third-party testing laboratory. "NSF" formerly stood for "National Sanitation Foundation" (not to be confused with the *National Science Foundation*). For general information on NSF International, visit http://www.nsf.org.

- U.S. Environmental Protection Agency (EPA) "Environmental Management System Benchmark Report: A Review of Federal Agencies and Selected Private Corporations." (EPA-300R-94-009). December 1994. The EPA Benchmark Report was prepared by the EPA Federal Facilities Enforcement Office in the Office of Enforcement and Compliance Assurance. The report was prepared to assess how defense-related and civilian agencies, and certain private corporations perform against a benchmark of an ideal organizational, managerial, and operational performance system to execute environmental responsibilities. The EPA Benchmark Elements were incorporated into the evaluation matrix of this paper.

- Arthur D. Little "Strengthening Environmental, Health, and Safety Management Systems." (PM93888-02LAC795/16774). No date. Information brochure providing the ES&H management system framework of the consulting firm of A.D. Little. The principles of the ADL framework were incorporated.

- National Environmental Policy Act (NEPA) - The National Environmental Policy Act (NEPA) of 1969 provides a basic framework for interdisciplinary planning for any federal project or activity. While NEPA is normally associated with construction projects, NEPA is also applied for both broader agency planning/programmatic efforts, and smaller, more routine actions. NEPA lends itself well to integration with other ES&H management systems because NEPA, by statute, requires an "interdisciplinary approach" and provides a good framework for collaboration with other ES&H disciplines to ensure that all ES&H matters are considered early in the planning phases of a project or a program. Where NEPA is strong in impact assessment techniques, it is weak in mitigation, monitoring and follow-up. Other management systems can benefit from NEPA's emphasis on impact assessment. NEPA was not included in the matrix because it is not typically thought of as an ES&H management system. However, at many DOE DP sites, the NEPA process is used as a basis for, or as a part of, the process of planning ES&H needs for construction projects.

- Environmental Leadership Program – Environmental Management Systems Guidelines - The U.S. Environmental Protection Agency (EPA) has issued draft guidelines for an Environmental Management System (EMS) under their Environmental Leadership Program (ELP). The EPA "Environmental Leadership Program Environmental Management Systems Guidelines" (Appendix A), draft May 15, 1997, provides insight into what EPA envisions as an exemplary environmental management system (EMS). The EPA Guidelines specify that an EMS should contain the following five major elements:

1. Environmental Policy
2. Planning
3. Implementation and Operation
4. Checking and Corrective Action
5. Management Review

Further information on the EPA ELP is available through Larry Stirling, team leader, Environmental Management Systems Team, EH-41, 202 586-2417.

- Compliance-Focused Environmental Management System (EMS) - The EPA National Enforcement Investigations Center (NEIC) has issued guidelines on their view of an EMS which is compliance-focused. Their document is "Compliance-Focused Environmental Management System - Enforcement Agreement Guidance" (EPA-330/9-97-002), August 1997. Their compliance-focused EMS has twelve key elements and is designed to supplement other EMS models such as ISO 14001. Their twelve elements are:

  - Management Policies and Procedures
  - Organization, Personnel, and Oversight
  - Accountability and Responsibility
  - Environmental Requirements
  - Assessment, Prevention, and Control
  - Environmental Incident and Noncompliance Investigations
  - Environmental Training, Awareness, and Competence
  - Planning for Environmental Matters
  - Maintenance of Records and Documentation
  - Pollution Prevention Program
  - Continuing Program Evaluation and Improvement
  - Public Involvement / Community Outreach

  For more information, contact Larry Stirling, team leader, Environmental Management Systems Team, (EH-41) at (202) 586-2417; or contact Steve Sisk (EPA NEIC) (303) 236-3636, x-540. ❖